Aalto University
School of Business

MONEY AND CLINICAL TREATMENT DECISIONS

How information on costs affects Finnish medical doctors' decision-making

Master's Thesis
Piia Vuorela
Aalto University School of Business
Department of Management studies
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Aalto University
School of Business

Aalto University, P.O. BOX 11000, 00076
AALTO
www.aalto.fi

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Author Piia Vuorela

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Abstract

Healthcare expenditure is on the rise, forming currently 9,5 % of the gross national product in Finland. Further rising is anticipated with the ageing population. Medical doctors make treatment decisions, and therefore also make an impact on costs. A big health, social services and regional government reform is to be initiated in Finland. This will put pressure also on medical doctors to pay notice to healthcare costs.

The purpose of this study was to find out how information on costs of treatment would affect Finnish medical doctors' clinical decision-making. 56 doctors from three public healthcare organizations participated in an internet-based study spring 2017. They were given a hypothetical patient case along with evidence-based treatment options based on Current Care guidelines, and information on costs. Then, they were asked to evaluate whether cost information affected their clinical decision-making. They were also presented various claims on the relationship between costs and clinical effects, and asked about which stakeholders should evaluate this relationship.

Two out of three medical doctors said that cost information does not affect clinical decisions making. In clinical decision-making, emphasis is on the clinical side. Many would, however, choose the most cost-effective treatment option, if the options were clinically equal. In case cost difference was remarkable, some might choose the cheaper but clinically less efficient option. As for stakeholders to evaluate the relationship between costs and treatment options, the respondents most often chose the medical doctor treating patient, local organizational managers, Ministry of Social Affairs and Health / Parliament, the National Advisory Board on Social Welfare and Health Care Ethics (ETENE).

I hope this thesis will offer inspiration for healthcare managers when pondering, how medical doctors might be lead towards more cost-reducing practices. In this thesis, also costing systems applicable in healthcare were reviewed. Knowledge about these will be emphasized during the planned big health and social services reform in Finland. It is good also for the medical profession, which has a profound knowledge of the branch, to know how costs are formed. I further hope this thesis would serve to stimulate discussion on costs in healthcare among medical doctors and, also, on our possibility to affect these costs.

Keywords healthcare, costs, medical doctors, decision-making

Tekijä Piia Vuorela

Työn nimi Raha ja hoitopäätökset. Miten tieto hoidon kustannuksista vaikuttaa lääkärin päätöksentekoon.

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Tiivistelmä

Terveydenhuollon kustannukset kasvavat. Niiden osuus bruttokansantuotteestamme on 9,5 prosenttia. Kun väestö vanhenee, kustannusten kasvu kiihtyy. Lääkärit tekevät hoitopäätöksiä, ja täten vaikuttavat syntyviin kustannuksiin. Suunnitteilla olevan suuren sosiaali- ja terveydenhuollon uudistuksen myötä myös lääkärikunnan tulee lisätä kustannustietoisuuttaan ja -osaamistaan.

Tässä tutkimuksessa selvitän, miten tieto hoidon kustannuksista vaikuttaa lääkäreiden hoitopäätöksiin. Sähköiseen kyselytutkimukseen osallistui 56 lääkäriä kolmesta julkisen terveydenhuollon organisaatiosta keväällä 2017. Heille esitetiin kuvitteellinen potilastapaus, Käypä hoito -suositusten mukaiset hoitovaihtoehdot ja niiden kustannustiedot. Tämän jälkeen pyydettiin arvioimaan, vaikuttiko kustannustietojen esittäminen omaan hoitopäätökseen. Lisäksi kysyttiin mielipiteitä hoitojen kustannuksista suhteessa niiden kliiniseen hyötyyn erilaisten väittämien avulla, sekä kysyttiin kenen tulisi tehdä päätöksiä siitä, miten hoidon hinta vaikuttaa sen valintaan.

Kaksi kolmesta lääkäristä arvioi, ettei tieto hoidon kustannuksista vaikuta hoitopäätökseen. Hoitopäätöksissä lääkärit painottivat kliinisiä seikkoja. Monet kuitenkin valitsisivat kustannustehokkaimman vaihtoehdon, mikäli hoidot olisivat kliinisesti samanarvoisia. Mikäli kustannusero olisi huomattava, saattaisi osa valita myös halvemman, mutta kliinisesti tehottomamman hoidon. Tahoiksi, joiden tulisi arvioida kustannusten vaikutusta hoitovaihtoehtoihin, vastaajat valitsivat useimmiten hoitavan lääkärin tai paikallisen organisaation johdon, sekä STM:n ja valtakunnallinen sosiaali- ja terveysalan eettinen neuvottelukunnan (ETENE).

Toivon tämän tutkielman tarjoavan terveydenhuollon johtajille virikkeitä heidän pohtiessaan sitä, miten lääkärikuntaa voitaisiin ohjata kustannustehokkaisiin toimintatapoihin. Tässä tutkielmassa on myös esitetty terveydenhuollossa käyttökelpoisia kustannuslaskentatapoja. Näiden tuntemus korostunee Suomessa suunnitellun sosiaali- ja terveydenhuollon muutoksen myötä. Tällöin myös lääkärikunnan, jolla on vahva toimialatuntemus, on hyvä tuntea kustannusten muodostumista. Toivon, että tämä tutkimus myös stimuloi lääkärikunnan keskustelua terveydenhuollon kustannuksista ja ammattikuntamme mahdollisuudesta vaikuttaa niihin.

Avainsanat terveydenhuolto, kustannus, lääkäri, päätöksenteko

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My dearest partner Janttu, there are not enough words to describe what you bring into my life. It is my privilege to enjoy your never-ending support and your sense of humor. The Laajalahti pikeperch have also been incredibly patient, and they are still there, waiting for you. My dear sons Urho, Aarne and Paavo: yes, having now completed these studies, I guess I will have to "get a life now!"

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1. Introduction

1.1. Background

Health expenditure and financing has grown steadily in the majority or the OECD countries during the present millennium (OECD 2017). In the US, health care costs already exceed 17 % of GDP in year 2011 (Kaplan and Porter, 2011). In Finland in 2014, health care costs were 19,5 billion euros, making 3 576 euros per capita and forming 9,5 % of the gross national product (Matveinen and Knape, 2016).

An ageing population and continuous development of treatment methods are major factors behind the rising health care costs in the western countries. In Finland, the proportion of residents aged 65 years and older was 21 % in 2016. Statistics Finland has projected that by year 2030 this age group will already form 26 % of the population (Official Statistics of Finland, 2012). In absolute numbers, this equals approximately 1 150 000 elderly residents in 2016 and approximately 1 722 000 in 2030. As shown by a recent report on the Finnish population by the National Institute for Health and Welfare, health care expenditure per capita rises by increasing age (Kaipainen and Eskelinen, 2014).

Once a person contacts healthcare, the healthcare personnel decides on the choice of diagnostic investigations, treatments, as well as rehabilitation interventions. In our Finnish healthcare system, these tasks are mainly assigned to medical doctors, even though some other professions such as therapists (eg. physiotherapists, psychotherapists), nurses and psychologists participate in these actions to some extent. Therefore, most health care costs derive from decisions made my medical doctors. This is what is meant by the saying that ‘the doctor’s pen is the most expensive instrument in health care’.

Health care aims at prevention, cure and rehabilitation of illness as well as maintenance of health. This is the first and foremost reason of all medical treatment. Medical doctors might not consider costs at all at the point of clinical decision-making. On the moment a medical doctor makes a decision on diagnostic tests or treatment or rehabilitation

interventions, the moment the doctor also makes a decision on use and allocation of costs, whether he or she thinks about it or likes it or not. This has also been a topic of discussion. For example, I have heard pondering on whether healthcare costs could be reduced in case doctors would take costs into account every time they make a clinical decision. A more radical thought is whether doctors should be 'forced' to consider costs and, also, to use the most cost-effective option. Doctors have also wondered whether considering costs is a doctor's job in the first place. Further, another interesting topic is whom or which profession or stakeholder should be the one weighing the burden of costs against clinical benefits of treatments. Stakeholders such as the medical profession, managers, and politicians have been mentioned in these discussions. Whichever the answers would be and in whose opinion, the topic of limited healthcare resources and a pressure for cost control is a current issue that we cannot escape.

As medical doctors play a key role in the chain of producing both value to the patient and healthcare costs to the society, let me continue by enlightening the line of thought a medical doctor typically follows. Describing this ages-old profession, this cannot be done without referring to the Hippocratic Oath, which I will cite in the following chapter. I will then highlight what is presently known about medical doctors' awareness on costs, identify the research gap leading to this study, define the research questions, and introduce the reader the structure of this thesis.

1.2. The medical doctors' mindset and the Hippocratic Oath

Primium est non nocere (*latin*). This, possibly the most famous of Hippocrates' thoughts on patient care, advices a doctor not to harm his patient. Another well-known thought of his advices to detain from doing harm even in the case when you cannot cure or help.

The legacy of Hippocrates lives on. The Hippocratic Oath, an oath obligating us to act to the best of our patients, is taken across countries by medical students upon graduation

(U.S. National Library of Medicine, 2017). Upon reading the Hippocratic Oath it is easy to understand that medical doctors, practitioners of this ages-old profession, are oriented in clinical rather than not economic thinking. The Hippocratic Oath has undergone various modernization phases. A version modernized in 1964 (Lasagna, 1964) is given below. The English translation of the original version (Edelstein, 1943) is given in Appendix 1. In Finland, The Finnish Medical Association (FMA) has modified a Finnsh version of the oath, called the 'Medical Doctor's Oath' (Lääkäriliitto, 2017), which is given in Appendix 2. It is taken by most Finnish medical students upon graduation (Kattelus, 2017).

Hippocratic Oath

I swear to fulfill, to the best of my ability and judgment, this covenant:

I will respect the hard-won scientific gains of those physicians in whose steps I walk, and gladly share such knowledge as is mine with those who are to follow.

I will apply, for the benefit of the sick, all measures [that] are required, avoiding those twin traps of overtreatment and therapeutic nihilism.

I will remember that there is art to medicine as well as science, and that warmth, sympathy, and understanding may outweigh the surgeon's knife or the chemist's drug.

I will not be ashamed to say "I know not," nor will I fail to call in my colleagues when the skills of another are needed for a patient's recovery.

I will respect the privacy of my patients, for their problems are not disclosed to me that the world may know. Most

> especially must I tread with care in matters of life and death. If it is given me to save a life, all thanks. But it may also be within my power to take a life; this awesome responsibility must be faced with great humbleness and awareness of my own frailty. Above all, I must not play at God.
>
> I will remember that I do not treat a fever chart, a cancerous growth, but a sick human being, whose illness may affect the person's family and economic stability. My responsibility includes these related problems, if I am to care adequately for the sick.
>
> I will prevent disease whenever I can, for prevention is preferable to cure.
>
> I will remember that I remain a member of society, with special obligations to all my fellow human beings, those sound of mind and body as well as the infirm.
>
> If I do not violate this oath, may I enjoy life and art, respected while I live and remembered with affection thereafter. May I always act so as to preserve the finest traditions of my calling and may I long experience the joy of healing those who seek my help.

Would thinking about costs violate the Hippocratic Oath? Emeritus professor Markku Järvinen reminds that each medical oath reflects its own era (Järvinen, 2016) and emeritus professor Martti Kekomäki points out how Hippocrates lived in a totally different environment than we do: “Hippocrates did not live under a health care budget set by the city of Athens” (Kekomäki, 2016). Indeed, Hippocrates did live some two thousand years

before our relatively new era of health economics and, as Kaplan and Porter put it, the "cost crisis in health care" (Kaplan and Porter, 2011).

1.3. The medical doctors' awareness of costs

The way medical doctors see themselves as personnel having to take economical aspects into account seems to vary. According to a survey by Tilburt et al. (2013) among 2 556 randomly selected American medical doctors only 36 % reported that they have "major responsibility" for reducing health care costs. They also named other parties like patients, hospitals and health systems, pharmaceutical and device manufacturers, trial lawyers and health insurance companies, to be responsible (Tilburt, 2013). However, another study reports views of medical doctors who consider that the medical profession specifically should be involved in cost considerations (Brook, 2014).

Irrespective of whether medical doctors themselves think that they should or should not be active players in cost reductions there has, due to their central role, been interest to find out how aware of costs medical doctors are in the first place. It seems that medical doctors do not seem to be very aware of the true costs of either diagnostic tests (Allan and Lexchin, 2008; Vijayasarathi et al., 2016), treatments (Allan and Lexchin, 2008) or rehabilitation interventions (Kuiken, Prather and Bloom, 1996), as shown by the following studies.

Allan and Lexchin (2008) performed a systematic literature review in order to see how aware medical doctors are on the costs of diagnostic tests or treatments other than medicines. They found only fourteen articles that were eligible for their final analysis. Based on these, they found out that doctors are very inaccurate in their estimations on costs. The poor accuracy was not dependent on demographic features such as country, year of study, level of training or field of specialization.

Vijayasarathi et al. (2016) conducted an online survey on more than 1 200 medical doctors in the US in order to find out how well they were aware of the costs of computerized

tomography (CT). CT is a radiologic imaging technique used largely in diagnostics, but also on follow-up of some diseases. The machinery is expensive. Vijayasarathi et al. (2016) found out that that the doctors' knowledge on the costs was poor. Each respondent was asked to evaluate the cost of five different, commonly used CT scans. Only approximately 6 % of the evaluations fell even in the range of ±25 % of the correct cost, the other evaluations being even more incorrect. Those working in the radiology department, whose area of expertise the CT scans are, did not do any better than those working in other departments.

Kuiken, Prather and Bloom (1996) studied medical doctors' awareness on the costs of rehabilitation. Forty-six American medical doctors were asked about various individual interventions in the rehabilitation process. Their estimation on costs were hugely inaccurate. For example, they made on average approximately 50 % errors when estimating costs of blood sample analyses or imaging techniques, and even 100 % errors when estimating costs of pharmaceuticals. In their study, the doctors were also asked on how confident they felt with their own estimations. They answered not being confident at all: they described their estimations were pure guesses in 80 to 90 % of their estimates (Kuiken, Prather and Bloom, 1996). Alike in the studies by Allan and Lexchin (2008) and Vijayasarathi et al. (2016), also in this study by Kuiken, Prather and Bloom (1996) the level of experience of the doctor was not associated with the accuracy of knowing costs.

Both Allan and Lexchin (2008) and Vijayasarathi et al. (2016) conclude that doctors' awareness on costs should be raised. This might be achieved by bringing cost data available to doctors in the clinical situations. Long et al. (2016) designed an intervention study to see whether doctors' awareness on the costs of blood sample analyses could be raised by providing visual display of costs of each analysis the doctors intend to order. They found out that via this means the awareness was indeed raised (Long et al., 2016). What remains to be seen is whether such awareness would affect decision-making, and result in choosing less costly choices and thereby in cost reductions.

1.4. Research gap, research questions and contribution of the study

The need for this study arises from the following two empiric notions. First, doctors make clinical treatment decisions that define both instant costs and costs occurring in the future. Second, there is, to my knowledge, no evaluation done on the attitudes of Finnish doctors towards having to consider costs at the time of clinical treatment decisions. Neither am I aware of a similar international study, though I cannot rule out the possibility that one exists. The aim of this study is to find out how information on costs of treatment would affect Finnish medical doctors' clinical decision-making. As, at present, we lack this information, the present study was designed to fill this research gap.

The specific research questions are as follows.

- Does information on the costs of treatment affect clinical decision-making of Finnish medical doctors, as evaluated by themselves?
- What are the reasons that the information on costs does or does not affect clinical decision-making?
- Who should decide on how costs of treatment should affect treatment choices, as evaluated by the doctors?

This study will serve several purposes. First, it will contribute to the literature in the field. Secondly, the observations made in this study can have direct practical implications. It gives grounds to considering whether leading medical doctors by cost information would result in cost reductions. In such a case, a practical implication for software vendors would be to add information on costs in the electronic tools used by doctors. Thirdly, I hope this study adds to the ongoing larger discussion on whose role it is to make decisions on costs of health care and at which level should these decisions be made: at the everyday doctor-patient interaction, at healthcare organizations' managerial level, or at societal level. The latter would include, for example, decisions on what treatments are to be offered by public health care. The theme is highly contemporary.

1.5. Structure of the thesis

Following the introductory part this Master's thesis is structured into five main parts. First, a literature review is given in Part 2. It provides an overview on how outcome is measured within healthcare (Chapter 2.1.). It then proceeds into introducing costing systems that either acknowledge (Chapter 2.2.) or don't acknowledge clinical outcomes (Chapter 2.3.), and provides an example of combining them (Chapter 2.4.). It also introduces the theoretical approach of this study, action research (Chapter 2.5.), and gives examples of its use in health care (Chapter 2.5.1.), as well as positions the present study within the action research approach (Chapter 2.5.2.). Then, the Methods part describes composing the study and introduces the participating organizations (Chapter 3.1.), describes composing the cases (Chapter 3.2.), describes performing the study and gives the response rates (Chapter 3.3.), and discusses ethical aspects (Chapter 3.4.). In the next part, empirical findings are presented along with their analysis and discussion (Part 4). Here, the findings are grouped into the following themes or entities: response rates (Chapter 4.1.), the degree to which information on costs affected decision-making (Chapter 4.2.), attitudes on bringing out information on costs at the point of clinical decision-making (Chapter 4.3.), the doctor's time (Chapter 4.3.), treatment decisions being based on clinical aspects (Chapter 4.5.), the patient and citizen as a paying party (Chapter 4.6.), the society as a paying party (Chapter 4.7.), ethicality (Chapter 4.8.), stakeholders to evaluate how information on costs should affect clinical decision-making (Chapter 4.9.), and medical doctors and costing systems (Chapter 4.10.). Following this, a summary of the findings is given (Chapter 4.11.). Finally, a conclusion of the study is made by providing a research summary (Chapter 5.1.), practical implications (Chapter 5.2.), limitations of the study (Chapter 5.3.) and suggestions for further research (Chapter 5.4.).

2. Literature review

This literature review introduces the methods of evaluating costs in health care. The uniqueness of health care as an industry lies in the outcome, health. As health is so precious to us and, righteously so, seen as a human right, the costs of individual treatments, treatment processes or health systems in general should not be addressed without paying notice to the health outcomes. Therefore, in this chapter I will first offer an introduction to how health outcomes may be assessed.

The costing methods introduced in this chapter may be categorized in two: those methods that combine costs with clinical health outcomes and those that do not, but have costs and resource use as the only viewpoints. The first have been developed within healthcare and fall in the academic field of health economics. The latter originate from other industries and have only recently been implemented in health care.

The two major methods used for cost assessing in health economics are the cost-effectiveness analysis and cost-utility analysis. In cost-effectiveness analysis costs of a treatment are evaluated in relation to clinical outcomes, e.g. a decrease in blood pressure or improvement of asthma symptoms. Cost-utility analysis takes it further: costs are analyzed in relation not only to an individual clinical outcome, but to the health-related quality of life. This allows calculating the so-called quality-adjusted life years (QALY) gained. Following this, a brief word is given to key performance indicators and the Choosing Wisely initiative, that aims ridding healthcare from waste caused by unnecessary treatments.

In other industries cost analyses seem to have a stronger tradition than in health care, at least in the public healthcare in Finland. This is natural, as any for-profit business needs to continuously make efforts in cutting down costs and maximizing profit. Among the medical profession there tends to be discussion on whether such methods for assessing costs, that are used in other industries, can or cannot be implemented into medicine. Usually the conclusion is that they cannot. The argument typically lies in the uniqueness of health care, the line of thought being: ‘as health and longevity of life may not be

evaluated in monetary units, pure costing assessment is not applicable to health care'. In this literature review I will introduce the reader to two costing systems that originate from other industries and that have been successfully used in healthcare, namely the activity-based costing system (ABC) and the time-driven activity-based costing system (TDABC). For comparison, the traditional costing system of hospitals is briefly introduced. I will also show how the industry-driven TDABC may be successfully combined with the 'clinical' cost-utility assessment.

This study falls within the theoretical approach of action research, which is introduced. Due to its versatility, it has also been used in various kinds of studies within healthcare, examples of which are given. I will also describe how the present study falls within the action research approach. Finally, a summary of the literature review will be given.

2.1. Assessing clinical outcome and performance

2.1.1. Clinical outcome measures

Clinical outcomes are various. They may be classified into those reported by healthcare professionals and those reported by patients (patient-reported outcomes, PRO), and may be collected into registers. Outcomes reported by professionals typically address parameters objectively assessible, such as disease status or mortality. Those reported by patients typically address parameters related to functionality and well-being, such as pain or quality of life. As an example, one's knee joint might be assessed by a professional, e.g. a physiotherapist measuring the angle of flexion, and by the patient reporting whether it is possible to play football. The U.S. Food and Drug administration (2017) (REF) provides the following definition for PRO: "A PRO is a measurement based on a report that comes directly from the patient (i.e., study subject) about the status of a patient's health condition without amendment or interpretation of the patient's report by a clinician or anyone else." PRO measurement is usually conducted via a questionnaire: patient

reported outcome measure (PROM). For example, the EQ5D is a 5-item questionnaire used for measuring a person's quality of life.

Another term and aspect is patient-reported experience measures (PREM), which measure satisfaction or experience with the care process. Concerning the nomenclature, it has also been suggested that PROM could stand for person-reported outcome measures, as not all subjects reporting health outcomes are patients (Fayers and Machin, 2007).

PROs may be used, as Van der Wees et al. (2014) describe, for purposes such as practice improvement, assessment of the performance of clinicians and organizations, and as a metric for value-based payments. Nilsson et al. (2015) describe earlier research data showing how collecting PROs may improve patient–provider communication and patient satisfaction. Further, there are promising views on aggregated data at organizational, regional or national level helping evaluate healthcare performance by, for example, benchmarking. In Sweden, national quality registers are advanced. As Nilsson et al. (2015) describe, in the Swedish healthcare system national quality registers are obliged to incorporate PROs. These are used for example to improve the precision for indications of surgery or to improve patient information. Clinical outcomes may be incorporated in economic evaluation in the cost-effectiveness or cost-utility analysis, as described later (see chapter 2.2.).

2.1.2. Health-related quality of life (HRQoL) and Quality-adjusted life years (QALY)

Taking defining health outcome further, to a more holistic level, and also in order to better estimate the impact of treatments on a person's well-being, several assessment scales for evaluating health-related quality of life (HRQoL) have been developed. Some are categorized as generic and may be used with any health intervention, as they measure HRQoL in general. One such scale is the 15D-scale, which has been developed by Sintonen and his colleagues in Finland (Sintonen, 2001). These enable comparison of the

benefits of treatments across medical specialties. In addition to these generic scales there are disease-specific scales designed for use with individual illnesses only (Mittal 2006).

In addition to quality of life we people value its longevity. Once change in HRQoL, achieved by a healthcare intervention, is combined with the change in longevity (life expectancy) quality-adjusted life years (QALY) will be gained. Alike the more direct clinical outcome measures described earlier, QALYs may be incorporated in economic evaluation, namely in cost-utility analysis (see chapter 2.2.2.).

2.1.3. Key Performance indicators and Choosing Wisely

Quality of performance in health care has been monitored by performance indicators. In addition to being used as a means to both measure and improve quality, they have also been used for to achieving and proving equality of treatment between units. These quality indicators may be process or outcome indicators. They may also be used as managerial vehicles for improving performance between units, as productivity per unit may be analyzed. (Peled, 2016)

One form of poor productivity is activity that does not produce any good at all. Within healthcare, this would mean treatments that are not effective. In addition to being a productivity loss such treatments may also be characterized unethical: they subject a person to possible side-effects while no beneficial effects are achieved, and give a person groundless hope of being cured. The Choosing Wisely -campaign by the American Board of Internal Medicine has addressed this issue with the goal being "to reduce waste in the health care system and avoid risks associated with unnecessary treatment" (ABIM Foundation, 2017). The need for this initiative has been seen, and the initiative been adopted, in many countries. Further national initiatives include, among others, Choosing Wisely UK (2017), Choosing Wisely Canada (2017), and Choosing Wisely Australia (2016). In Finland, the Finnish Medical Society Duodecim has, in 2016, initiated a similar practice (Käypä hoito, 2017). The aim is to improve effectivity, productivity and safety

of health care by letting go such old treatment options that are not based on scientific evidence.

2.2. Cost assessment in healthcare, acknowledging clinical outcome

2.2.1. Cost-effectiveness analysis

Costs of particular treatments comprise direct and indirect (productivity) costs. Evaluating the former is easier, as it comprises tangible within-treatment-producer costs such as equipment and personnel costs. The latter comprises, for example, travel costs and costs due to absence of work and are, therefore, more indirect and hence more difficult to estimate (Drummond 2005). Time-driven activity-based costing increases the accuracy of analyzing treatment costs. Time-driven activity-based costing further allows estimating the costs per patient per individual treatment episodes (Kaplan and Anderson 2004; Kaplan and Porter, 2011).

2.2.2. Cost-utility analysis

Cost-utility analysis refers to the ratio of costs to QALYs. It is considered as the preferred method of economic evaluation in healthcare, as it notifies the impact of the healthcare intervention on HRQoL. Cost-utility is expressed as a monetary unit per QALY gained. The question that prevails without precise answers is, how much can one QALY gained cost? In Finland, no accepted cost per QALY has been defined. Internationally, an accepted cost of a QALY would surely depend on the gross national product as well as cultural features on how different health outcomes and illnesses are valued. In the United Kingdom, the National Institute for Health and Clinical Excellence (NICE) has outlined, that interventions costing less than £20 000 may be regarded cost-effective enough to be provided by the public sector. Interventions costing between £20 000 and £30 000 should

be evaluated against how precise and solid the estimations of health benefits gained by them are. This evaluation is emphasized once considering interventions that would cost more than £30 000 per QALY. (National Institute for Health and Clinical Excellence, 2017)

2.3. Cost assessment in healthcare, not acknowledging clinical outcome

2.3.1. Traditional costing system

Öker and Özyapici (2013), in their comparison of different costing systems, describe the traditional costing system that has been widely used. Here patient-days are used as the cost driver. First, direct costs, such as doctor and nurse costs and medicine costs, are allocated to the appropriate services. All other costs are allocated by patient-days. This leads to inaccurate costing estimates. As one example Öker and Özyapici (2013) give customer service representatives' work upon discharging patients from hospital. Each patient discharge requires a similar and therefore equally time-consuming service from them. Yet, as patient-days are the cost driver, a patient who has stayed in hospital for five days is allocated five times more for this service than a fellow patient who stayed for only one day. This leads to overestimation of costs of such treatments that require a longer in-hospital stay and underestimation of costs of such treatments that only require a shorter in-hospital stay.

2.3.2. Activity-based costing system (ABC)

The activity-based costing system (ABC) was regarded as a welcome improvement in costing and it solved the basic problem of the traditional costing system described above. It does not consider patient-days as the driver for costs as in the traditional costing system but, as its name implies, the activities undertaken. In ABC, a two-stage activity is

performed: costs are first assigned to activities and following this to products and services (Hansen, 2006). However, as one disadvantage, ABC was found not to notice unused capacity (Öker 2013).

2.3.3. Time-driven activity-based costing system (TDABC)

Time-driven activity-based costing system (TDABC) was introduced by Kaplan and Anderson in 2004. It builds on ABC by adding the element of time and keeping it the cost-driver. In short, the following steps are taken in TDABC. First, the cost per time unit is estimated. This may be done by dividing the cost of the resource, for example a person's monthly salary, with the amount of minutes the person works a month. Here, it is assumed that some 20 % of working time is spent on activities other than work itself. This includes, for example, breaks, communication and training. Therefore, dividing the salary with this practical working time, i.e. 80 % of the full working time, gives the cost per unit. (Kaplan & Anderson 2004)

The second step in performing TDABC is to estimate the unit times of activities. A unit time means the number of minutes it takes to perform one task. (Kaplan & Anderson 2014) In healthcare, this could, for example, be the number of minutes it takes to perform an electrocardiogram recording (ECG). This may be done by interviewing employees or by direct observation (Kaplan & Anderson 2014). The third step is deriving cost-driver rates. This happens by multiplying the cost per time unit and the unit time just described. (Kaplan & Anderson 2014) Let me give an example.

Let us assume that it takes five minutes to perform the ECG by a nurse. The nurse's monthly salary in Finland might be 2 400 € (SuPer, 2017), and total expenses to employer 3 600 € (includes social security expenses and bonus holiday pays). Full theoretical working time might be 38 hours 15 minutes a week (Palkkavertailu, 2017), equaling approximately 9 639 minutes a month. With these assumptions, the cost per unit would be as follows: 3 600 € / (0,8 x 9639 min) = 0,47 €/min. As we assumed five minutes to

be the unit time of activity, we will get the following cost-driver rate for a nurse performing an ECG: 5 min x 0,47 €/min = 2,35 €.

The advantage of this approach, as compared to the traditional ABC, is seen to be superior accuracy in estimating the cost of an activity. Further, TDABC is described to be flexible and easy-to-use in case changes would occur in any of the parameters included in the calculation (salaries, time spent). Further, it has been found useful in identifying where there is waste or suboptimal use of human resources. All these features are beneficial in process planning, cost control and resource allocation (Kaplan & Anderson 2004; Kaplan et al. 2014; Öker and Özyapici 2013).

Despite the novelty of TDABC in healthcare, examples of its successful use are already a few from different branches of medicine. These include acute and non-acute fields, such as the emergency room and out-patient treatment of depression, respectively, and operative and non-operative units, such an orthopedic unit and a cancer center, respectively (Alaoui and Lindefors 2016; Kaplan et al. 2014; Yun et al. 2016). TDABC has been shown to help in identifying various kinds of slack. For example, the Boston Children's Hospital orthopedic department identified how a single activity, a slight disturbances in processing X-ray orders, resulted in unexpectedly high additional costs as well as prolonged waiting times for patients. The Brigham Women's Hospital orthopedic department, on the other hand, observed that through the entirety of their care cycle, from admission to post-operative follow-up visits, several steps could be improved and used together to improve the entirety. (Kaplan et al. 2014) In the emergency room setting, TDABC seems to offer an excellent tool for process improvements (Yun et al. 2016). In addition to these examples from high-income countries, Mandigo et al. (2015) performed a pilot study in Haiti, one of the poorest countries in the world. An example of improving their processes upon using TDABC was streamlining sterilization procedures of instruments. The importance of cost savings becomes emphasized in low-income settings.

Kaplan et al. (2014) also identified what it takes to make TDABC work as well as it did in the above examples. The crucial points are that the organization needs to provide time for implementing TDABC, medical managers and their teams need to engage in

identifying the process of patient care, and financial managers need to be co-operative in providing costs to each activity of the patient care process identified by the medical team. If any part of this managemental trio fails to co-operate, no results will be gained.

The novelty of TDABC in the healthcare sector also raises, righteously so, cautious voices. Although TDABC is, by many, considered superior to the so far used costing systems within healthcare, Sharon et al. (2016) make the following point.

> *"Although TDABC is being advocated by important opinion leaders in the field of health care economics, it is worth pointing out that independent researchers are only now beginning to explore the usefulness of this technique in clinical practice."*

Sharon et al. (2016) continue to explain their thought by saying that techniques that might work in the hands of experts might be difficult to employ by non-experts. Further, they consider that once becoming wider used this costing technique might further evolve in the hands of its users.

2.4. Combining TDABC and clinical cost-effectiveness

Alaoui and Lindefors (2016) have performed a study where they combined TDABC and clinical outcomes in cost-effectiveness analysis. The study setting was a public hospital in Sweden. The disease analyzed was depression due to its major burden on health: depression has been identified as the second-leading cause of disability worldwide in the Global Burden of Disease study (Alaoui and Lindefors 2016; Ferrari 2013). The treatment method analyzed was internet-based psychotherapy, as it has both been shown to be effective and, also, offers as an innovative solution to reduce the queues for treatment. In the first phase of their study, Alaoui and Lindefors (2016) used TDABC to identify actual costs and use of time of personnel more precisely as earlier. Following this, cost-

effectiveness analysis, which combined clinical outcomes (alleviation of depression in Patient Health Questionnaire depression scale PHQ-9) with the costs of treatment gained in the first phase by TDABC, was performed. The study showed that the psychiatric unit could improve their use of human resources and reduce costs with no compromise in clinical outcomes. Namely, doctors, of whose time there was lack of, could be replaced with psychologists for a particularly identified activity in the treatment process (post-treatment assessment). Costs per treated case reduced from $709 to $659 (international dollars[1]). (Alaoui and Lindefors, 2016)

This study by Alaoui and Lindefors (2016) is an excellent example of implementing TDABC in healthcare and showing that it neither results in any compromises in patient care nor causes dissatisfaction in clinicians engaged in the treatment process. Hence, once future studies alike this become available, the suspicious minds towards using industry-derived costing systems in health care may become fewer in number.

2.5. Action research as a research approach

Action research aims at understanding work practices and at improving them. This includes acquiring knowledge, identifying influential factors, and by these means improving the work practices in focus. In action research, participants are strongly involved (McNiff and Whitehead, 2002; McNiff and Whitehead, 2010). Winter and Munn-Giddings (2005) describe action research to "bridge the ever-present gap between 'theory' and practice" (pp. 7). The nature of action research comes forward in the quote from Swantz (2011): "It is crucial that research is not separated from life." Depending on the perspective of the researcher, action research has, for example, been described to

[1] "An international dollar has the same purchasing power as the U.S. dollar has in the United States. Costs in local currency units are converted to international dollars using purchasing power parity (ppp) exchange rates." CHOosing Interventions that are Cost Effective (WHO-CHOICE) by WHO, http://www.who.int/choice/costs/ppp/en/ (cited 9.3.2017).

interconnect social, biological and ecological sciences as well as to have religious or spiritual anchors (Wikcs, Reason and Bradbury, 2011). In more common terms, the orientation of action research has been described as ‘practical know-how’ or ‘popular science of and for the people’ (Wicks, Reason, and Bradbury, 2011, p. 11).

Key elements of action research, as identified by McNiff and Whitehead (2002), include a) the researcher being central to the process, b) the researcher also learning about one’s self, c) the aim being at continuing development rather than closing conclusions, and d) the process being participative and educational (p. 203). It is easy to see that action research can be applied in any areas of working life and that it is not restricted to any discipline. Action research has, indeed, been used in many different contexts (McNiff and Whitehead, 2002; McNiff and Whitehead, 2010; Winter and Munn-Giddings, 2005; Wikcs, Reason and Bradbury, 2011).

Within organizational action research the focus can be on improving work practices of individuals, but also on managerial aspects or on organizational change (McNiff and Whitehead 2002; Bradbury et al., 2011). McNiff and Whitehead (2002) identify three paradigms within organizational action research: the interpretative, the critical theoretic, and the living theory paradigms. The interpretative approach involves field tutors or coaches who support and interpret the work of the field researchers. In the critical theoretic approach participants are encouraged to see what factors dominate and control their work practices. The living theory approach, on its behalf, encourages individuals to identify their values, to try to commit to them in every day work, to observe possible contradictions between these values and work practice and, further yet, to try to solve these contradictions. These approaches have all been adopted worldwide. (p. 201) (McNiff and Whitehead, 2002)

2.5.1. Action research in health care

Due to its versatility action research has been used for various kinds of research aims also within health care (Bate, 2000; Bradbury and Lifvergren, 2016; Hughes, 2011).

Waterman et al. (2001, cited by Hughes, 2011) has analyzed the scope of these aims in 48 British research reports and has shown that "The most common reasons for choosing action research are about encouraging stakeholders to participate in making decisions about all stages of research, or empowering and supporting participants." Action research has also often been used for the reason that it educates. Further aims in healthcare include solving practical, concrete or material problems, or analyzing change (Waterman et al. 2001, cited by Hughes, 2011).

In health care, problems might sometimes be multifaceted or involve many stakeholders. This may apply at the individual level, i.e. in situations of treating patients, as well as at the managerial level. These characteristics are another element that make action research applicable for healthcare, as both Bradbury and Lifvergren (2016) and Waterman et al. (2001, cited by Hughes, 2011) have shown it to be useful when problems are complex or when patients have complex care needs. Bradbury and Lifvergren (2016) argue, based on ten years of experience from Sweden, how using the action research approach and engaging all stakeholders involved in the various actions of treatment protocols makes it possible to achieve two important goals: a) health outcomes are improved and b) costs are saved. Another example of involving many stakeholders includes the work by Chiu (2011). The author demonstrates the use of participatory action research in the context of various community-based programs. In these, various ethnic or language groups were involved and the needs of all these separate groups had to be addressed (Chiu, 2011). Taken these together, in the work by Bradbury and Lifvergren (2016) the focus was on implementing the interventions on the individual level (choosing treatment protocols for individual patients) and in the work by Chiu (2011) the focus was on community level. Winter and Munn-Giddings (2005) list further examples where action research has been used in health care. These include projects involving service-user research, community development, management in organizations, as well as reflection on professionals' own work (Winter and Munn-Giddings, 2005).

Hughes (2011) describes how, in healthcare research, the participatory worldview underlying action research is in close connection with the positivist paradigm underlying experimental research (p. 3). Here, it is pertinent to notify the typical quantitative research

types within healthcare and medical research, and to consider their connection with qualitative research, namely, action research. The typical quantitative study types are intervention, observational and diagnostic studies and systematic reviews with meta-analysis, when applicable (Ruffano et al., 2012; Furlan et al. 2009; Schulz, Altman and Moher, 2010; Straus et al. 2010; Vandenbroucke, 2004). Intervention studies, and especially the randomized controlled trials, are the cornerstone in studying the effects of treatments or other interventions (Schulz, Altman and Moher, 2010). Observational studies may be used when, for instance, it is not ethical to randomize persons into intervention groups (Vandenbroucke, 2004). A classic example is studying the effect of tobacco smoke on health. Diagnostic studies, as their name implies, evaluate whether use of diagnostic tests result in improved health outcomes (di Ruffano, 2012). Systematic reviews and meta-analysis, in their part, may be used to draw together results of any of these study types. A meta-analysis may be used to further combine quantitative data in a mathematical way. However, systematic reviews may also be used to collect and analyze qualitative data (Furlan 2009; Straus, 2010).

Using systematic reviews on either quantitative or qualitative research as a basis of identifying further research needs, for instance for action research settings, is one point of connection between these study types. The resent work by Poels et al (2016) offers an example of this. Their systematic review is from the field of reproductive health. The aim was to find out why women in western countries do not use preconception care once planning pregnancy, even though this has been shown to improve pregnancy outcome. They identified both barriers and facilitators. Based on their findings they say that it is now possible to "refocus interventions and strategies, aiming on enlarging the awareness, perceived importance, and accessibility of preconception care to improve its uptake" (Poels et al., 2016). Here, I see them raising a typical need for action research, which is: 'aiming on enlarging the awareness'. Also, such further research would require participation of the women involved which, meaning the participation, again is a call for action research, as described earlier (McNiff and Whitehead, 2002; McNiff and Whitehead, 2010).

In addition to using systematic reviews as a basis for further studies with an action research approach, I also see also a way of combining quantitative medical research and action research within the same study. Let us continue with the above example. The research aim raised by Poels et al. (2016), raising awareness, could be reached by action research. However, to find out whether one practice is more efficient than another, a comparative study design is needed (Schultz 2010). The way to combine these two aims would be to design a study where two or more study populations would be randomly allocated to different awareness-raising interventions or to no intervention at all. The study populations could be, for example, groups of women, communities, or professionals at health care centers. The intervention itself could be carried out as an action research project. In this way, the study design would fulfill the criteria of a randomized controlled trial (Schultz 2010) and the intervention, aiming to raise awareness could, in turn, be carried with the methods of participatory action research (Alber, 2011; Winter and Munn-Giddings, 2005).

2.5.2. Action research and the present study

In this chapter, I will first summarize the features of the present study. Following this, I will explain how the present study fits into the approach of action research. In the end, I will evaluate my own position in this study.

In the present study, the participating Finnish medical doctors, working in the public sector, evaluated their own decision-making. Traditionally, in a medical doctor's working day, treatment decisions have been based on clinical information. This information includes benefits and harms (effects and side-effects) of treatment and the effort a patient must make for the treatment (e.g. repeated laboratory visits). Now, in the present study, participants were asked to evaluate their decision-making once new data, data on costs, is visible in parallel with the traditional clinical data. This was done by first involving the participants in a patient case. The case was hypothetical, but still a typical one. Real patient cases were not involved due to reasons of privacy protection.

Following this initial stage, the participants were also asked to express their opinions by evaluating various claims about the relationship between costs and clinical treatments. This topic is a value-driven one and is of interest to the whole society. The participants of this study were also asked to consider, which stakeholders should take part in evaluating how costs are to influence treatment choices.

Action research is a diverse approach, as described earlier (Chapter 2.5.). It has several features that make it applicable to the present study. Firstly, the present study involves a real-life simulation and, quoting Swantz (2011) already repeatedly, "It is crucial that research is not separated from life." Also, as Saaranen-Kauppinen and Puusniekka (2006) put it, action research is typically directed in practical issues. One might argue that a patient case simulation does not equal real-life situations. Here it is worth noting, that the study participants are all practicing medical doctors. Therefore, it is reasonable to assume that they instantly understand the situation and context of the patient case simulation, as they have 'been there'. Thus, I am positive that there is no misconception of the real-life situation. Also, 'going real-life' would require that the participating organizations had such software, e.g. such electronic patient records, where the costs and clinical effects of all treatment choices would automatically pop up on the practitioner's screen. This is not the way electronic patient records in Finland currently function, and therefore this study could not have been performed in a real-life situation.

A second feature whereby the present study fits in the action research approach is that the participants were asked to evaluate their own decision-making as well as address their values. Action research has, indeed, proved suitable in studies where reflection on professionals' own work is needed (Winter and Munn-Giddings, 2005), or one is encouraged to identify one's values (McNiff and Whitehead, 2002).

A third feature of action research of note here is that it is characterized as being educational (McNiff and Whitehead, 2002; Waterman et al. 2001, cited by Hughes, 2011), it is used to raise awareness (Poels et al., 2016) and to induce change (Saaranen-Kauppinen and Puusniekka, 2006). As data on costs is not a traditional parameter in clinical decision-making, as already said, the present study also serves the purpose of

raising awareness. Hopefully, it will raise cost-awareness within healthcare not only among those participating in this study, but also among readers. It might even initiate a change in decision-making practices.

In addition to the three features of action research given above, I would also like to bring forward the nature of action research as described by Brydon-Miller et al. (2003). The authors explain the nature of action research as compared to natural sciences:

> Action research challenges the claims of a positivistic view of knowledge which holds that in order to be credible, research must remain objective and value-free.

The present study addresses a theme that definitely is not value-free: the balance of costs and health gain. Therefore, action research is a good fit for this study, as this approach appreciates the active formation of the participants own thoughts and values. Brydon-Miller et al. (2003) also introduce different traditions of action research and summarize them followingly:

> As disparate as these traditions are, what links them is the key question of how we go about generating knowledge that is both valid and vital to the wellbeing of individuals, communities, and for the promotion of larger-scale democratic social change.

The present study addresses a question that operates on all the mentioned levels: individuals, communities and a large-scale democratic change. The way how medical doctors weigh costs in relation to treatment options is a matter of all these levels. While the impact of a doctor's decision on the individual is evident, let me enlighten the effect on the society. Healthcare should, democratically so, be equally available to all. Yet, it is known that there is diversity in both the availability of treatments for Finnish citizens (National institute for Health and Welfare, 2017) and, also, in processes within healthcare (Torkki, 2012). Once a further parameter, costs, enters the moment of clinical decision-making, there is a potential for even further diversity. Especially the question on which stakeholders should evaluate the relation of costs to treatment options is central in our society's ability to achieve equal healthcare for all. Hopefully this study

serves in stimulating general discussion on this now, on the eve of the Finnish national social and healthcare reform (Ministry of Finance and Ministry of Social Affairs and Health, 2017).

My own position in this study is myself being a medical doctor alike the participants. I believe that this affects the participants in the following way. The request to participate was sent via email. I know from my own experience, that medical doctors might not always be motivated to answer various requests the email box readily offers. A strong influence is on the factor of where the request comes from. For example, based on my own experience and talks with colleagues, requests to participate in surveys coming from the Finnish Medical Association are generally regarded as worth answering, whereas those coming from market research companies might not. The former are perceived as useful in, for example, the Medical Association developing services for us, the medical profession. Colleagues might feel it important or even a duty to answer these surveys. The latter example, surveys by market research companies, might include questionnaires on, for example, practices of prescribing drugs and reasons for prescription choices. Medical doctors might not always regard these as worth answering. Therefore, I would like to think that the request to participate in this study coming from a colleague – and also provided with the name of the Finnish Medical Society Duodecim – raises a positive attitude.

1.1. Summary of the literature review

To briefly recapitulate, this literature review aimed at introducing costing systems used in the field of healthcare as well as the theoretical approach of this thesis. Due to the uniqueness of healthcare as an industry - health as a ‘product’ not being comparable to for example consumer products - it was necessary to first introduce how health outcomes are measured. These outcomes may be clinical or performance indicators. The clinical outcomes may be classified as those reported by professionals (clinician-related outcomes) or by patients or other persons (patient-related or person-related outcomes).

The former are typically more objective and easily quantifiable (e.g. blood pressure expressed as mmHg) and the latter more oriented in experience or symptoms (e.g. pain, well-being). Performance indicators include outcome and process indicators. As in other industries, activity that is not effective equals productivity loss. In healthcare it means, in addition, unethical exposure of patients to side-effects of unnecessary treatment. In this literature review, the Choosing Wisely initiative by the American Board of Internal Medicine was introduced. This campaign, that has grown international, aims at ridding healthcare of unnecessary treatments that both are waste and expose patients to unnecessary risks.

For assessing costs, systems either acknowledging or not acknowledging clinical outcome were introduced. The former includes cost-effectiveness analysis and cost-utility analysis, and the latter includes the traditional costing system, and the more developed activity-based costing system (ABC) and time-driven activity-based costing system (TDABC). Cost-effectiveness and cost-utility analyses have been developed in the field of healthcare economics. Cost-effectiveness analysis combines clinical effects of treatment with costs, and cost-utility analysis combines health-related quality of life with costs. The latter of these two, therefore, is a more holistic approach. The other costing systems, ABC and TDABC on their behalf, come from industries other than healthcare. Traditionally, costs of for example hospital stay have been evaluated by the number of days spent in hospital. This has resulted in erroneous costing evaluations, as different activities performed during hospital stay were not allocated to those treatments using them. ABC corrects this handicap by addressing activities as cost drivers. TDABC takes it a step further, as it also addresses time used on activities and time not spent productively. It helps in identifying slack and enables more efficient allocation of resources. As a final part of reviewing costing systems, the clinically oriented ones and the industry-derived ones were woven together by a chapter providing an example on how TDABC and clinical cost-effectiveness may be combined, thereby combining two important entities: resource use and health gain.

Action research was introduced as a theoretical approach of this study. It is a versatile approach that is strongly connected to practice. It has also been widely used in the context

of health care, examples of which were given. Action research may be used to study organizational and managerial work practices, or individual work practices, as in this study. My own position here is myself being a medical doctor like the participants. Hopefully this has raised a positive attitude towards the study among them.

3. Methods

The project was carried out in collaboration with Nordic Healthcare Group Ltd., a Finnish company specialized in planning and developing health and social services, and with The Finnish Medical Society Duodecim, a scientific association established in 1881 to develop the professional skills and clinical practice of doctors. The Finnish Medical Society Duodecim produces Current Care guidelines. These are independent, evidence-based clinical practice guidelines made applicable to medical practice in Finland (Current Care Guidelines, 2015).

The study was performed in Finnish. In the following, I will describe composing the clinical cases (Chapter 3.1.), present the study questions (Chapter 3.2.), as well as present the participating organization and describe how the study was performed (Chapter 3.3.). Finally, study ethics is considered (Chapter 3.4.).

3.1. Composing the cases

To provide a real-life simulation, clinical patient cases needed to be constructed. For this, the first step was to decide what or which diseases to choose. It was agreed on that the following three criteria should be met.

- The disease(s) should be common and therefore carry a significant disease burden nationally.
- There should be more than one effective treatment option.
- There should be a Current Care clinical practice guideline available for the disease.

The first criterion was considered to make the case more interesting and meaningful. It would also, depending on the results, offer the possibility of cost reductions as a largescale disease burden is addressed. The second criterion is natural, as without an option for choice there would be no decision-making. The third criterion is a pragmatic one. The benefits and harms (effects and side-effects) of treatments are to be found in Current Care guidelines, where medical scientific knowledge is transparently and systematically evaluated. The Current Care guidelines also define themselves as covering "important issues related to health, medical treatment and disease prevention in Finland" (Current Care Guidelines, 2015). Therefore, they cover diseases that carry significant national burden and, therefore, the third criterion actually includes criterion one.

The number of diseases, and therefore the number of patient cases to be constructed for the study, was then to be decided. An informal inquiry among Current Care guideline editors was done to explore options. The following three diseases were chosen for this study: depression of moderate severity, bulimia nervosa and deep venous thrombosis. The impact on national disease burden is given as their prevalence in Table 1.

Table 1. Prevalence of the three diseases chosen for the cases.

Disease	Prevalence
Depression of moderate severity	5 % annual prevalence in Finnish adult population (Pirkkola, S.P., 2000) [1] 10 % estimated prevalence in patients of primary care (Vuorilehto, 2005) [1]
Bulimia nervosa	0,9-2,3 % in women, 0,1-0,5 % in men, life-time prevalence (Keski-Rahkonen, 2009; Preti, 2009)
Deep venous thrombosis	0,1-0,2 % annual prevalence (Silverstezin, 1998)

[1] Includes depression of all severity, not only that of moderate degree

For each of the above diseases a fictitious, but typical patient case was constructed. As medical doctors are generally busy and occupied with their clinical work, it was seen crucial that the patient cases were kept short (Table 5). The cases descriptions were accompanied by treatment options, for which the harms and benefits (effects and side-effects) as well as costs were given. The data on harms and benefits was taken from Current Care guidelines (2015). Data on costs were retrieved from databanks in the courtesy of NHG Benchmarking Ltd. These costs are based on costs of treatment episodes, which are expressed as costs per patient. These are based on time-driven activity-based costing (Kaplan and Anderson 2004; Kaplan and Porter, 2011). The cost data used in this project derives from real-life costs in Finnish health care. It would be based on these data that the participants would be asked to make their treatment choice.

3.2. The study questions

After making their choice of treatment the participants were asked to answer three questions. These were:

1. Did the information on costs affect your clinical decision-making?
2. Why so? Please read the following claims and choose on the scale from one to five whether you agree with the claim or not (one=strongly disagree, five=strongly agree).
3. Whom or which stakeholder, in your opinion, should be involved in evaluating how costs are to be considered in clinical decision-making? Please mark on the following choices ‘yes’ or ‘no’.

For question number two separate claims opened for those who answered ‘yes’ to question number one and for those who answered ‘no’. For question number three, an equal list of choices opened for all, irrespective of the answer for question number one. The list of claims for question number two are given in Table 2 and the list of suggestions for question number three are given in Table 3.

Table 2. List of claims in study question number two.

Claims that come visible after having answered 'no' to question number one[1]		Claims that come visible after having answered 'yes' to question number one[1]	
i.	Treatment decisions should be made on clinical grounds, and costs should not affect the decision.	i.	I take costs into account and discuss them with my patients in case the patient should have to pay part of e.g. medicines.
ii.	In a clinical situation, there is no time to think about costs.	ii.	If treatments are clinically equal (benefits and harms) the cheapest option should be taken, especially if the society pays for the treatment.
iii.	As a doctor treating my patients it is not my job to think about costs in the first place.	iii.	When society pays the treatment, I think also the cheaper option is a choice, even though it would not be clinically optimal, especially if the difference in costs is remarkable.
iv.	It is hard for me to decline a treatment from a person wanting it, even though I would know the treatment is not cost-effective.	iv.	When society pays the treatment one should always choose the most cost-effective choice, as in this way taxpayers' money will be available for as many in need of treatment as possible.
v.	The information on costs does not affect my decision-making, even if I would know that the patient would have to pay a part of e.g. medication.	v.	When society pays for the treatment, it is unethical use of tax-payers money to choose treatments that are not cost-effective.
vi.	Bringing information on costs visible is neither interesting nor necessary.	vi.	It is both welcome and modern to bring information on costs visible.

[1] Question number one: "Did the information on costs affect your clinical decision-making?" All original questions and claims were in Finnish.

Table 3. List of suggestions in study question number three on whom or which stakeholder should be involved in evaluating how costs are to be considered in clinical decision-making.

Medical doctor treating patient
Organizations' (e.g. hospital's or healthcare center's) management
Health scientists
Local politicians
Ministry of Social Affairs and Health / Parliament
Insurance companies
The National Advisory Board on Social Welfare and Health Care Ethics (ETENE)
A model from another western country should be adopted
Other person or party, who or which? (*open space provided*)

3.3. Participating organizations and performing study

Decisions on which health care units to ask for as collaborators were based on the nature of the cases. Deep venous thrombosis is typically treated in emergency rooms of hospitals that have 24-hour medical on-call service. Depression of moderate severity is typically treated in specialist care within hospitals. Bulimia nervosa is typically treated in primary care, including school health care. Basically, any healthcare unit in Finland could have been asked. The choice of whom to ask may be described as half-random. The following Finnish healthcare units were asked and they kindly agreed.

- Central Finland Central Hospital, Emergency clinic for case Deep venous thrombosis
- Helsinki University Hospital, Department of Mood Disorders for the case of depression of moderate severity
- City of Turku, Welfare Division for case Bulimia nervosa

The study was performed with the Questback Essentials internet-based program. It enables a questionnaire which proceeds according to what the respondent answers to each question. This feature was needed when proceeding from study question one to question two, as described above. The study questionnaire was accessed via a link that the participants received by email.

The research links were first opened for two weeks in two of the three organizations and for eight days in one organization. The latter was due to organization-dependent schedules that allowed the third organization to start later than the other two organizations. During this initial phase, only few answers were obtained from each organization. For the first two organizations, the initial e-mail was sent from Nordic Healthcare Group. Due to the small response rate one of the organizations themselves suggested that another email would be sent from within their organization, as this might promote a better response. This practice was then applied for both of those organizations that started first and, also, directly applied to the third organization, which now sent its first email. Along with this reminder one of the organizations (case Depression) also expanded the email circulation within their organization. One further reminder was sent from within two organizations, and two further reminders from within one organization. In all, response rates were not high, between 13 and 47 per cent. The numbers of responses are given in Table 4.

Table 4. Cumulative number of responses obtained following each email sent, given by cases.

	Number of responses (number recipients of emails)		
	Depression	Deep venous thrombosis	Bulimia
Initial email sent from Nordic Healthcare Group	2 (18)	4 (32)	na
Initial email sent from within own organization	na	na	6 (86)
Reminder sent from within own organization	17 (200)	11 (32)	11 (86)
Another reminder sent from within own organization	20 (200)	15 (32)	na
A third reminder sent from within own organization	30 (200)	na	na
Final number of responses	30 (200)	15 (32)	11 (86)

na = not applicable

3.4. Ethical aspects

Concerning research ethics, I think this study should apply the general ethical rules when involving human subjects, as outlined by Brydon-Miller (2011). These include treating study subjects by respectfully, but also by providing a research protocol that is potentially beneficial, and definitely not harmful, to them. In addition to the study subjects Brydon-Miller (2011) also pays attention to the institutions of both the participants and the researches themselves. Further, attention is given to fellow researchers and the relationships between the principal researcher and peers (Brydon-Miller, 2011). In the field of health care and medical research there are further ethical codes of conduct provided by the World Medical Association, based on the initial Declaration of Helsinki

in 1964, and since revised (World Medical Association, 2013). However, as the present project does not involve medical patients or individualized patient data, it is the codes outlined by Brydon-Miller (2011) rather than those of the World Medical Association (2013) that become emphasized. Concerning studies performed as part of thesis work, Helsinki University Hospital and Turku Welfare Division had research permission protocols, that were followed (decisions no 9/2017 and 390492, respectively).

4. Findings, analysis and discussion

The purpose of this study was to find out whether information on the costs of treatment would affect Finnish medical doctors' clinical decision-making. The rationale behind this was the fact that medical doctors are the ones making clinical treatment decisions and, therefore, they inherently are in key position on deciding on costs. A larger practical implication lies in whether leading doctors by cost information would result in cost reductions. On the way there, this study focused on the first step necessary: to find out whether medical doctors see information on costs to affect their clinical decision-making in the first place, and why so. As this is tied to the discussion on whom or which party should be the one(s) making these decisions on the relations of costs and treatments offered, the doctors were also asked about this.

In this chapter, the findings are presented along with their analysis as well as a broader discussion. This structure was chosen as it seemed to fit naturally. The analysis and discussion are very close to each other, and it is only a fine line where analysis ends and a broader discussion begins. Several of the themes discussed below are such that it would have felt artificial in splitting the chapters in two parts, for the purpose of structuring some thoughts under an upper rubric of 'analysis' and some under another upper rubric of 'discussion'. The compact chapter on ethicality is one good example (Chapter 4.8.).

The reader will be taken through the findings, along with their analysis and discussion, by grouping them into ten themes. The themes are based on analysis of the findings, which originally include the following five steps or entities in data collection:

- response rates,
- answers to the initial study question on whether cost information affected clinical decision-making,
- responses to six different claims in survey question two, with these claims being different for those who answered 'yes' and for those who answered 'no' to the initial question, equaling a total of twelve claims,

- answers to the third and final study question on whom or which stakeholder should be involved in evaluating how costs are to be considered in clinical decision-making, and
- the literature review, with reference to the costing systems.

The ten themes introduced below may include findings from one or more of the above steps. For example, the chapter on ethicality (Chapter 4.8.) includes findings from only one claim in study question number two, whereas the chapter on society as a paying party (Chapter 4.7.) includes input from three claims presented in study question number two, and the chapter on stakeholders in evaluating how cost information should affect clinical decision-making (Chapter 4.9.) includes findings from both study questions two and three. This grouping of findings by themes was, thus, done flexibly according to the topic rather than by arithmetical order of the study findings. This approach was considered more meaningful and, hopefully, also more interesting to the reader.

Concerning the graphical presentations of the findings, the results are given both by case and as a total number. However, once analyzing and discussing the findings total numbers, that combine all responses, are used. This is due to the limited number of responses by case. Therefore, making conclusions on how colleagues from different specialties or organizations see or value the issue on costs, as compared to colleagues from other specialties or organizations, would be somewhat far-fetched and might lead to over- or misinterpretation. Thus, the total numbers given below are more interesting, and give a better ground for analysis and discussion. In addition to these, a more detailed presentation on how respondents chose between stakeholders in study question number three is given in the appendices (Appendix 3 and 4).

4.1. Response rates

The response rates to this study were rather low, between 13 and 47 per cent. This limits the ability to draw conclusions and generalize the results into all Finnish medical doctors. However, I do not find this low response rate surprising, and I am grateful to all those

colleagues who took their time to answer the questionnaire. Let me consider reasons I believe there are behind the low response rate among doctors. I would like to suggest three major ones, although more may exist. Firstly, doctors carry a big work burden and work days tend to get rather busy. Secondly, alike many other professionals, doctors tend to get a lot of information via email, and questionnaires compete in this email load. Thirdly, doctors might get various kinds of requests to answer questionnaires, and not all might be eager on these. Let me briefly address each of these points separately.

The work burden of medical doctors often gets heavy. This has been acknowledged across nations (Panagioti, et al., 2017). In Finland, the Finnish Medical Association has regularly addressed the work environment, work burden and well-being of Finnish medical doctors (Kosonen, 2016). I find it understandable that questionnaires or any other tasks that are not directly related to one's work may be ignored. This might not necessarily mean that there would be any hostile or negative attitude, but just the workload itself prevents from using energy to tasks other than core ones.

Another reason for not using effort to answering questionnaires might be the information load coming via email. As I know from my own experience, medical doctors tend to get their own load of emails. These should be tended to on the time spared from clinical work. Most of a practitioners' time is directed to patient work. Even though this includes computer work, the computer is not used in the sense that one could, for example, check emails, not to speak of answering questionnaires. In clinical work the computer is used because of electronic patient records. Therefore, the time for reading emails and reacting to them is a limited part of the working day. In this time slot, medical doctors also need to react to various work instructions concerning their clinical work, such as new instructions on where particular patients should be referred to or which new ways particular laboratory tests should be there-on ordered. This type of information might easily override other, not so important messages, which might not reach the medical doctor's attention.

A third notion could be an attitude towards questionnaires. I know that medical doctors tend to get requests to participate in various kinds of surveys. These include surveys performed by commercial companies and done for marketing purposes. These might not

catch the interest of a medical doctor. It is possible that any request to answer a questionnaire per se already makes the recipient ignore the request and move on to the next email. However, I also believe that the nature of the present study, coming from a colleague and including the Finnish Medical Society Duodecim as one partner, might have risen a positive perception among recipients.

Finally, I would like to note that the response rates might also be compared by cases or by organizations, which either way expressed. However, I did not find this a sound approach as the numbers are too small for statistical comparisons. Yet, I chose to present the results by separating cases rather than by giving only total figures. This enlightens the slight differences in how the process of initial emails and reminders proceeded by case, and might provide ideas for others planning similar studies among Finnish medical doctors working within public health care.

4.2. The degree to which information on costs affected decision-making

After reading the patient case the respondents were asked to select from given treatment options, the number of which ranged from two to three. For two cases (Depression of moderate severity and Bulimia nervosa), all given options were chosen at least once. In one case (Deep venous thrombosis) one of the treatment options was not chosen by any respondent (Table 5).

All treatment options are evidence-based choices and are given in the Finnish national clinical practice guidelines, the Current Care Guidelines (2015). Thus, all choices are apt choices and in the repertoire of clinicians. The reason for one choice being left unchosen by any respondent may not be evaluated based by this first question, as it only required a yes or no -answer.

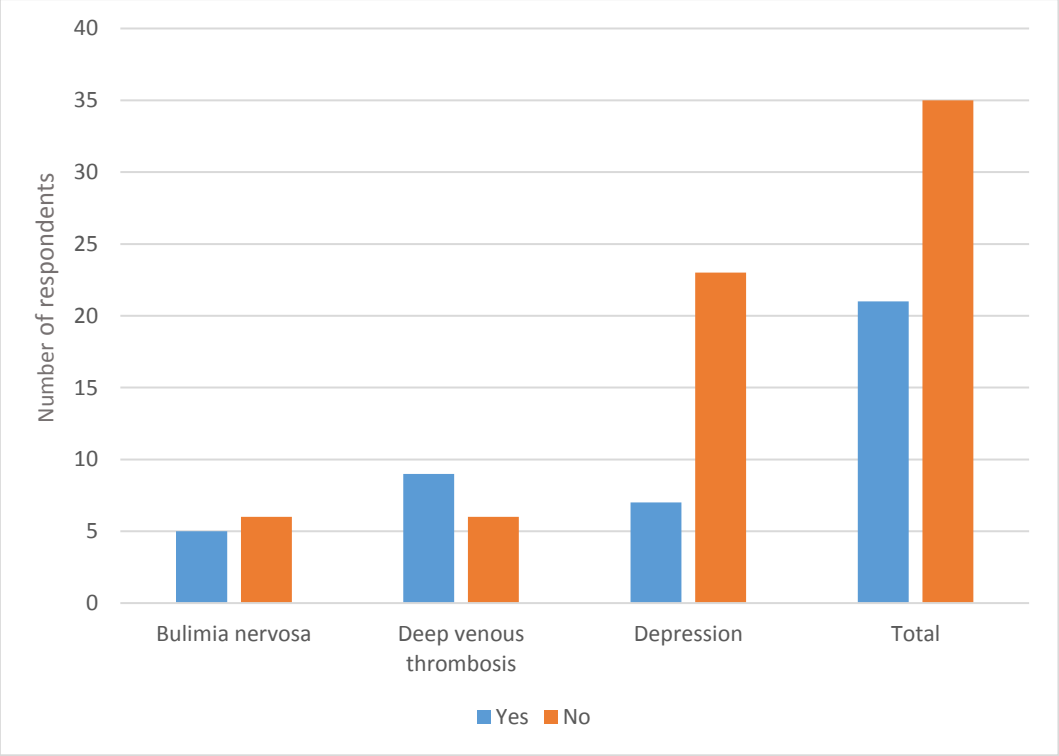
Table 5. Features of the three patient cases and treatment options in the survey, and distribution of choices between treatment options.

	Length of case (words)	Treatment alternatives given, cost	Cost of treatment Number of times chosen
Depression of moderate severity	84	a. Oral medication (citalopram) for eight months	221 € n = 5
		b. Short psychotherapy	680 € n = 4
		c. Combining medical therapy for eight months with short psychotherapy	721 € n = 15
		d. Combing medical therapy for eight months with internet-based therapy (e-therapy)	681 € n = 6
Deep venous thrombosis	165	Oral medication for three months, three choices:	
		a. Medicin I daily (warfarin)[1], upon initiation daily subcutaneous injections (enoxaparium) are needed for appr. a week	550 € n = 0
		b. Medicin II twice a day (dabigatran), upon initiation daily subcutaneous injections (enoxaparium) are needed for five days	340 € n = 2
		c. Medicin III twice a day, (rivaroxaban)	320 € n = 13
Bulimia nervosa	270	a. Oral medication (fluoxetine) for six to 12 months, doctor's and nurses' appointments	970 € n = 6
		a. Internet-based therapy (e-therapy, eCBT[2])	640 € n = 5

[1] requires approximately 15 blood sample controls during treatment period. [2] CBT = cognitive behavioral therapy

After making the treatment choice the respondents were asked to answer the first question on whether the information on costs affected their decision-making. This was a yes or no -question. More than half, 35 out of 51 (68 %) responded that the information on costs did not affect their clinical decision-making, while the rest said it did (Figure 1). Based solely on this finding, it could be concluded in a straight forward manner that leading doctors by information on treatment costs would be a limited leadership practice – in terms of wanting to achieve cost reductions – as one could only reach less than half of them. As what comes to the reasons behind this finding, implications are offered in the other themes discussed below.

Figure 1. Results on whether the information on costs affected clinical decision-making.



4.3. Attitudes towards bringing information on costs visible at the point of care

In this study, most medical doctors did not object to information on costs of treatment being made visible. Quite the contrary, this information was welcomed. In the second study question, a claim about this was presented for both those answering 'yes' and those answering 'no' to the initial question. Of those having answered 'yes' most respondents strongly agreed that 'It is both welcome and modern to bring information on costs visible.' (Figure 2). Of those having answered 'no', none strongly agreed with the claim: 'Bringing information on costs visible is neither interesting nor necessary.' (Figure 3). However, while in the 'yes-group' responses were rather unanimous (positive towards information on costs), in the 'no-group' the responses were somewhat more spread out: approximately a fifth rated two or three on the scale, indicating either no agreement or disagreement with the claim, or agreement to some extent. Still, as a whole, I find it fair to conclude that the majority of all respondents seem to have a positive attitude towards making information on costs visible at the point of care. I agree with these respondents, and I could even say that their answers prove that this thesis has been of a current topic.

Figure 2. Responses to claim: 'It is both welcome and modern to bring information on costs visible.'

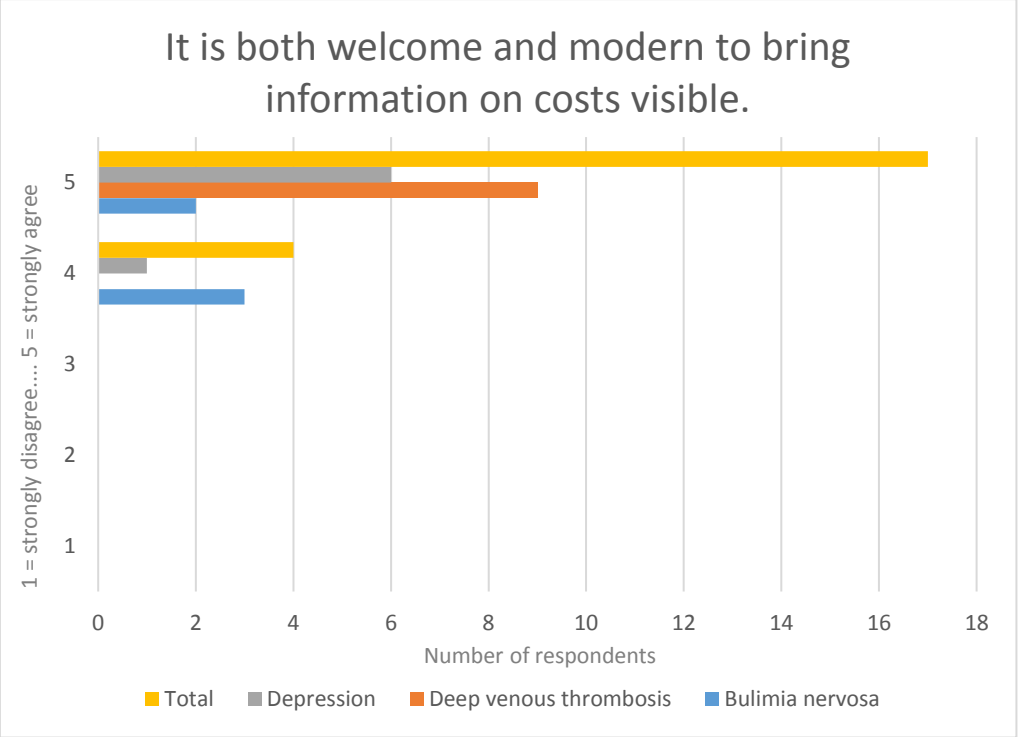
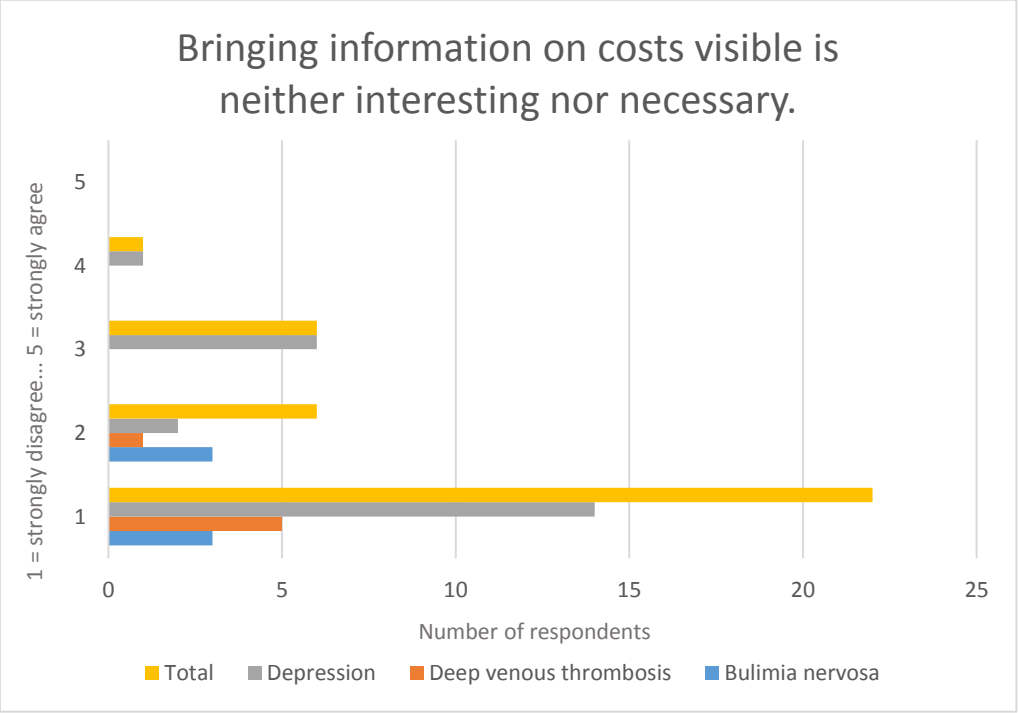


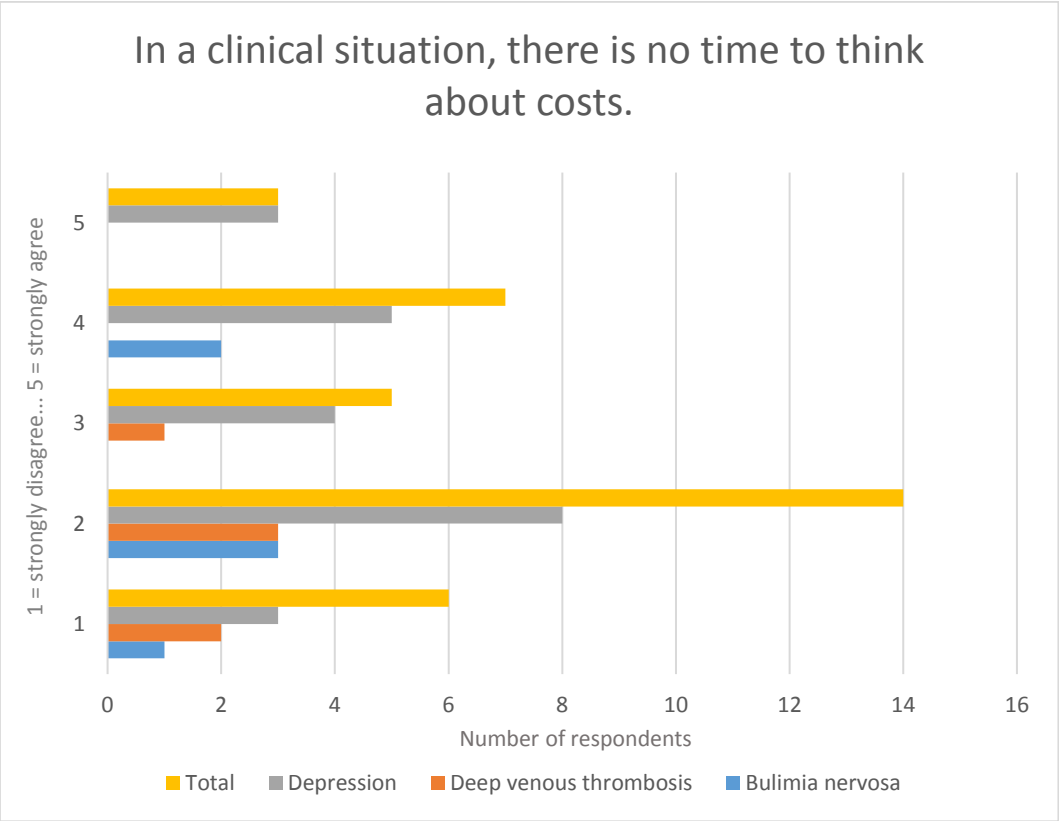
Figure 3. Responses to claim: 'Bringing information on costs visible is neither interesting nor necessary.'



4.4. The doctor's time

It is generally known that medical doctors tend to carry a big work load. Therefore, to find out whether time limits would be a determining factor on whether medical doctors consider costs at the point of care, the following claim was presented to those answering 'no' to the initial question: 'In a clinical situation, there is no time to think about costs.' Here the respondents used the whole range of the answering scale, with both the mode and median being choice two, i.e. slight disagreement with the claim (Figure 4). It therefore seems that most of these respondents did not perceive time to be a limiting factor here. Indeed, medical doctors are used to handling more than one aspect of a problem (health problem) at a time. Also, medical doctors are used to making decisions within a time frame that may be set either by the organization (e.g. appointment schedules), nature of work unit (e.g. emergency unit, with a queue of patients requiring attendance) or nature of the illness (e.g. brain or myocardial infarct, where a patient's prognosis depends on the tempo of clinical diagnosing and decision-making). Thus, for approximately two thirds of the respondents the reasons for leaving costs out of clinical decision-making lie elsewhere than in use of time. However, it does not mean that members of the medical profession would be immune to the psychological burden of time pressure: 10 out of 35 respondents (29 %) did agree with the claim. This is in line with the finding by Francke et al (2008). The authors report how time might be one factor limiting the implementation of new clinical guidelines among doctors.

Figure 4. Responses to claim: ‘In a clinical situation, there is no time to think about costs.’



4.5. Treatment decisions are based on clinical aspects

Even though Finnish medical doctors in this study were positive about seeing the information on costs of treatment options, the results suggest that this positive attitude did not directly correlate to this information translating into any changes in clinical decision-making, as presented above (Chapter 4.2., Chapter 4.3.). The following claim was presented to the group having answered ‘no’ to the initial question: ‘Treatment decisions should be made on clinical grounds, and costs should not affect the decision.’ This claim presents the classical view us medical doctors are seen to have: clinical decision-making rules over costs, and the latter should even not affect the former in any

way. A majority, 69 % or the respondents, agreed with the claim. The remaining 31 % either placed themselves in the middle or expressed disagreement to some extent. (Figure 5). I do not find this result surprising as it indeed reflects my profession's basic principle, to work for the best of the patient, and this claim might raise the thought of having to make a trade-off between money and health. Also, in clinical treatment decisions, parallel treatments may be evaluated against their benefits and harms (effects and side-effects), the effort the patient should make, and possible other simultaneous health problems (comorbidity). Each of us would, as a patient, have different preferences on which of the following, to give a few examples, would be preferable: weekly injections or daily oral medication, treatment requiring weekly laboratory visits or treatment with no laboratory visits but more side-effects, or a side-effect of headache against diarrhea. Once costs of treatment – those to be carried by the patient – are added to the equation, each of us would probably evaluate one's preferences again. These individual values and preferences are often seen the standpoint from which treatment decisions should be made, for a person to commit to the treatment. This might also relate to the responses given for the claim: 'It is hard for me to decline a treatment from a person wanting it, even though I would know the treatment is not cost-effective,' which was presented to those who answered 'no' to the initial question. For this claim, the whole scale of answers was used, with the median and mode both being two, i.e. somewhat of disagreement with the claim (Figure 6). This distribution of responses I find descriptive of the versatile nature of the doctor-patient interaction and, also, of the attempt of doctors to find a common ground with their patient.

Figure 5. Responses to claim: 'Treatment decisions should be made on clinical grounds, and costs should not affect the decision.'

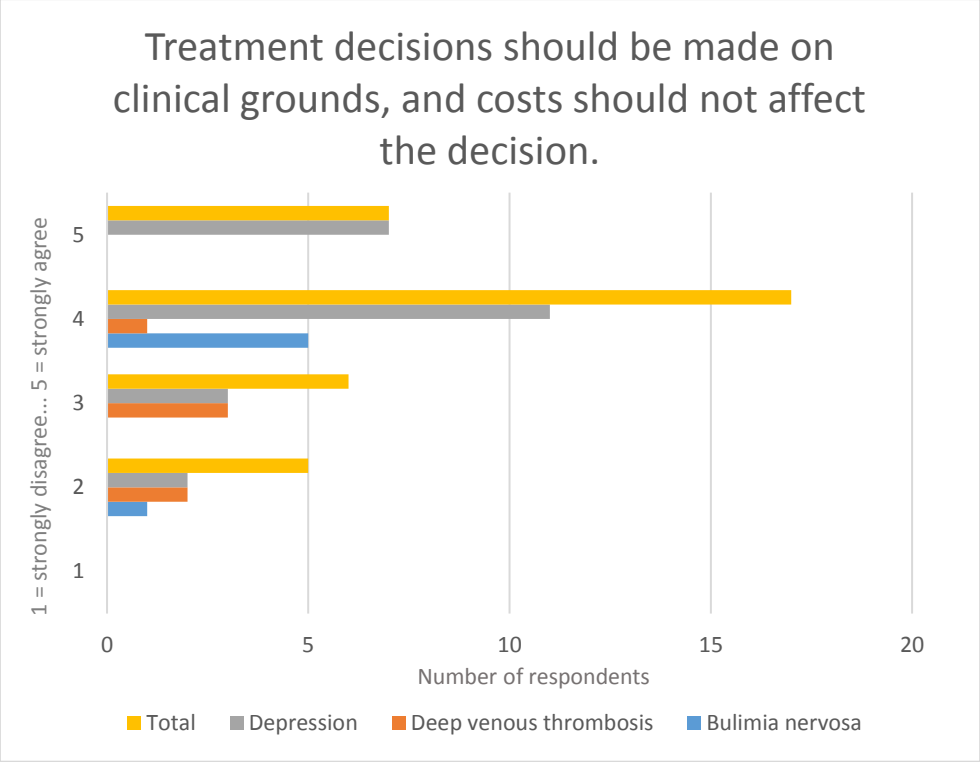
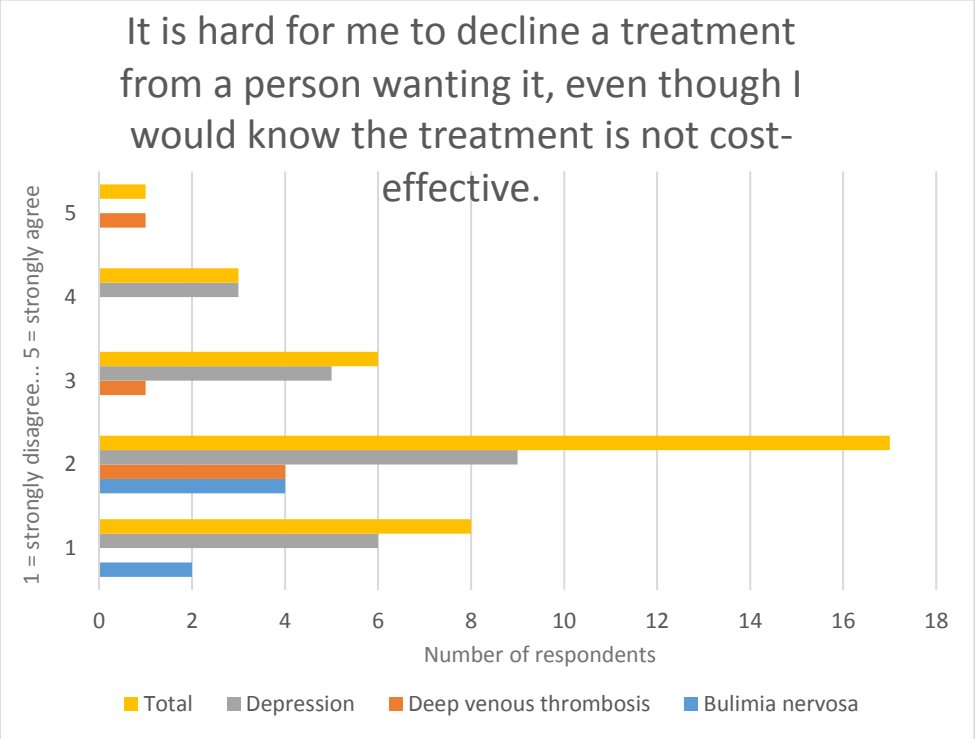


Figure 6. Responses to claim: 'It is hard for me to decline a treatment from a person wanting it, even though I would know the treatment is not cost-effective.'



Another factor, and a highly traditional one in the art of medicine, that could limit the potential to lead doctors by cost information, is the spirit of the Hippocratic Oath. A doctor should act to the best of one's patient. At the level of individual patients, one would only need to think about benefits and harms of treatment, and efforts and costs falling to the patient, as discussed above. Costs falling to the organization or society would not be in key focus. However, if we have limited resources in our society to spend on healthcare, could treating one patient mean leaving another one untreated? We have, in our Finnish national debate, been challenged to think about this issue (Kekomäki, 2016).

4.6. The patient and citizen as a paying party

Even though public health care in Finland is available for all citizens free or at a very low cost, citizens would typically pay a part of their medicines themselves. To find out how medical doctors would consider these costs falling directly to the patient in their clinical decision-making, the following claims were presented. Those who had answered 'yes' to the initial question were given the claim: 'I take costs into account and discuss them with my patients in case the patient should have to pay part of e.g. medicines.' Most respondents agreed (Figure 7). Those who had answered 'no' to the initial question were given the claim 'The information on costs does not affect my decision-making, even if I knew that the patient would have to pay a part of e.g. medicines.' Here, no respondent strongly agreed with the claim, and the median and mode were two, i.e. somewhat disagreement with the claim (Figure 8). It seems, thus, that irrespective of whether the respondent answered 'yes' or 'no' to the initial question on whether information on costs affected the respondent's clinical treatment decision, the respondent would still address costs with the patient, in case these costs would fall for the patient to carry.

I think this practice is, firstly, good customer service and, secondly, leads to better compliance with treatment. If, for example, a patient would consider the medical drugs too expensive, this could lead to either of the following: a) the drugs not being purchased

at all, and hence no treatment started, b) the drug being purchased but not used according to instructions (e.g. with a smaller dose or more seldom than recommended), or c) treatment being delayed due to patient returning to the doctor to ask for cheaper drugs. These outcomes would either lead to a) no health effect, b) reduced health effect, or c) delayed health effect. As health effect is the output of the doctor's appointment and of the health industry in general, then all the mentioned outcomes should be avoided. Based on the answers by the respondents, it may be concluded that Finnish medical doctors are well aware that costs of treatment, e.g. medical drugs, when carried out by the patient him- or herself, affect treatment compliance. Further, medical doctors wisely take this into consideration at the appointment.

Figure 7. Responses to claim: 'I take costs into account and discuss them with my patients in case the patient should have to pay part of e.g. medicines.'

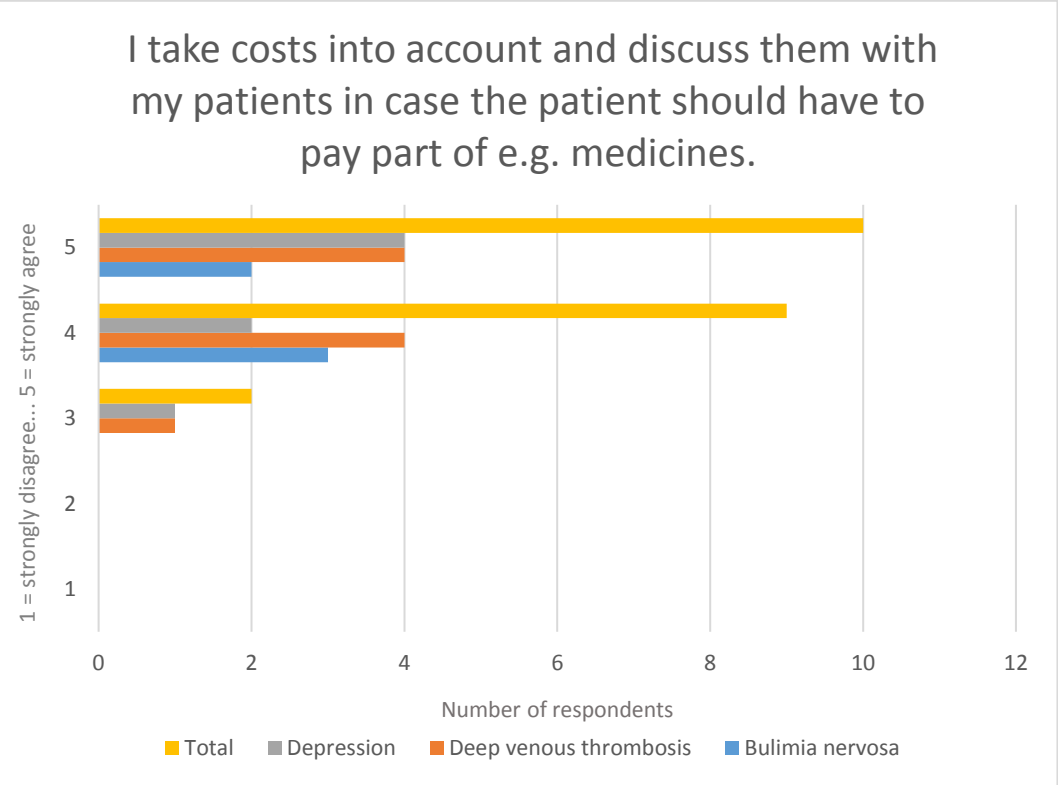
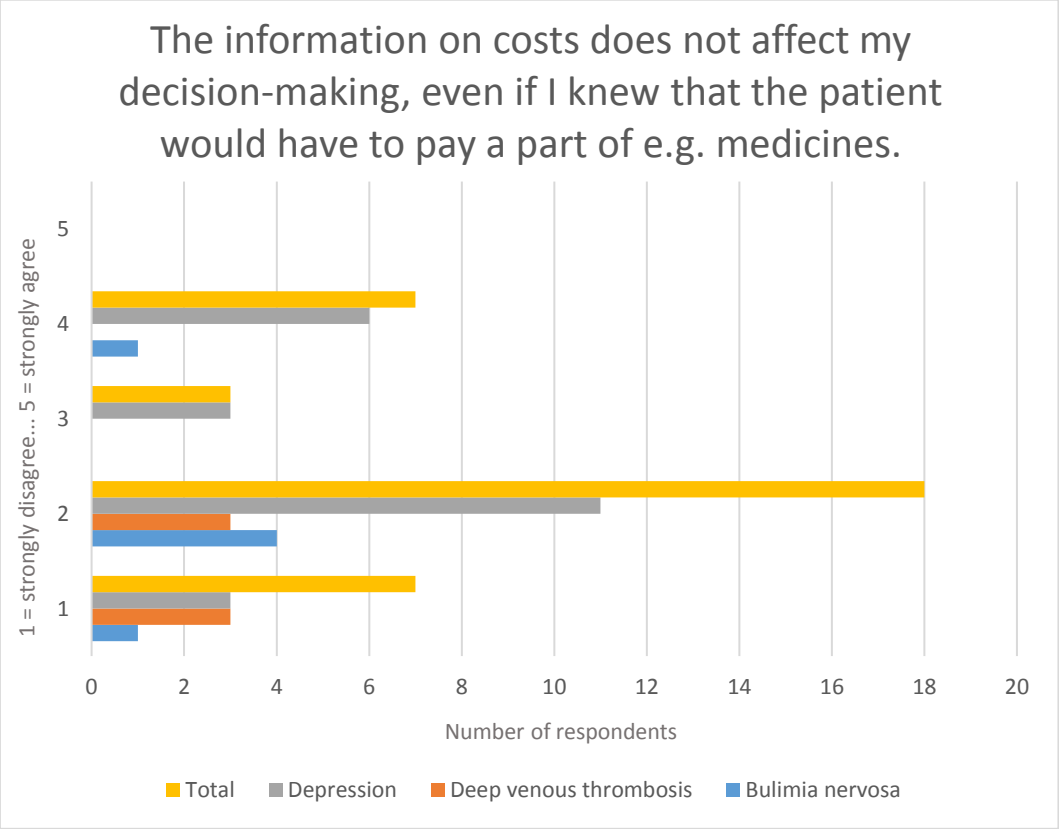


Figure 8. Responses to claim: 'The information on costs does not affect my decision-making, even if I knew that the patient would have to pay a part of e.g. medicines.'



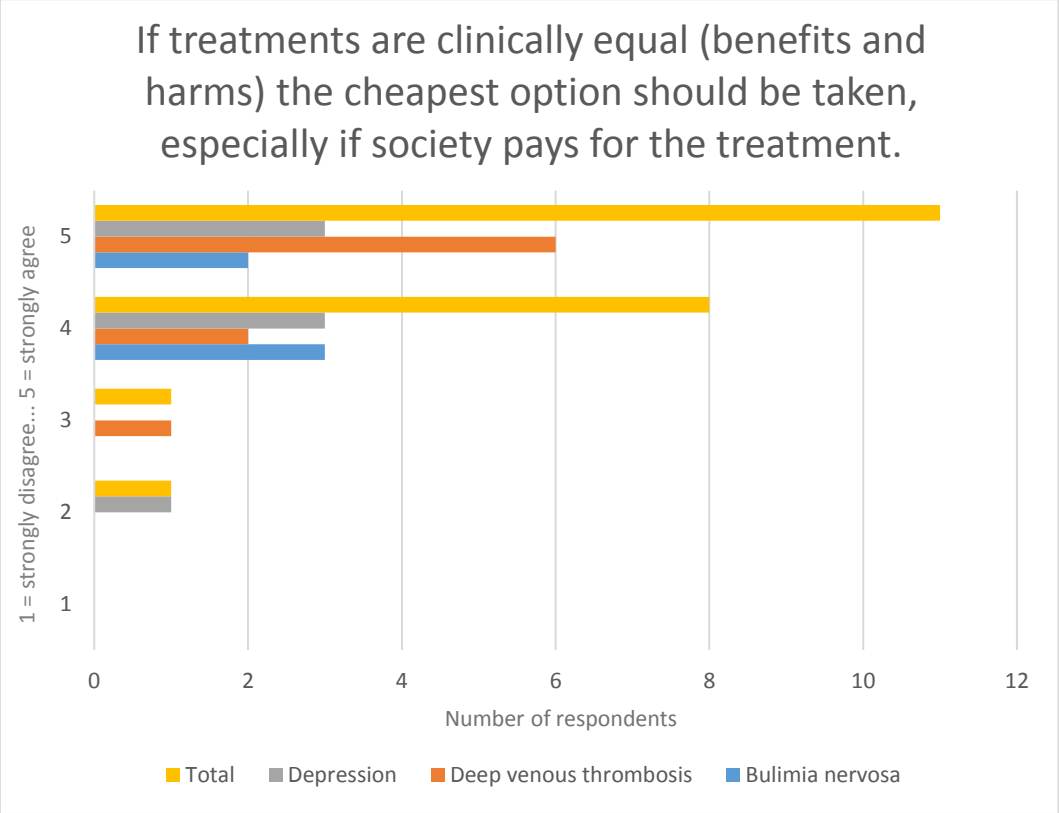
When talking about patients, that is, us citizens and tax payers, as a paying party it may be asked whether we should be given a bigger role and responsibility as what comes to our treatment choices causing costs for society. Once addressing this topic one quickly comes across the other, ever-present question on whether society should pay for diseases that rise from for example obesity and smoking and, therefore, may be argued to be caused by one's self and, thus, should not be paid for by other tax payers. I will not elaborate on this, as this arguable question extends beyond the scope of this thesis but, instead, will give one recent example of national decision-making that reduces medicine costs paid by the society. As part of the Finnish government program's prerequisite to save 150 million euros in medical costs, the Social Insurance Institution of Finland made some adjustments to reimbursements for diabetes medicine expenses (KELA). Insulin, a life-saving drug,

was left fully reimbursed while other diabetes medicines lost their status of full reimbursement. Since January 1st, 2017 these other medicines have only been reimbursed by 65 % for the part that exceeds the initial deductible of 50 euros. This change of reimbursement practice will affect slightly more than 300 000 persons. This is an example of effectively reducing society's health care costs by regulations that do not affect doctors. Firstly, this shows that reductions in society's medicine costs do not only derive from what a doctor prescribes. Thus, I hereby partly contradict my initial statement in this thesis, where I cited the old saying that 'the doctor's pen' determines most costs in healthcare. Secondly, this shows that the concept of leading doctors by cost information would not always even be needed for achieving societal cost reductions within health care.

4.7. The society as a paying party

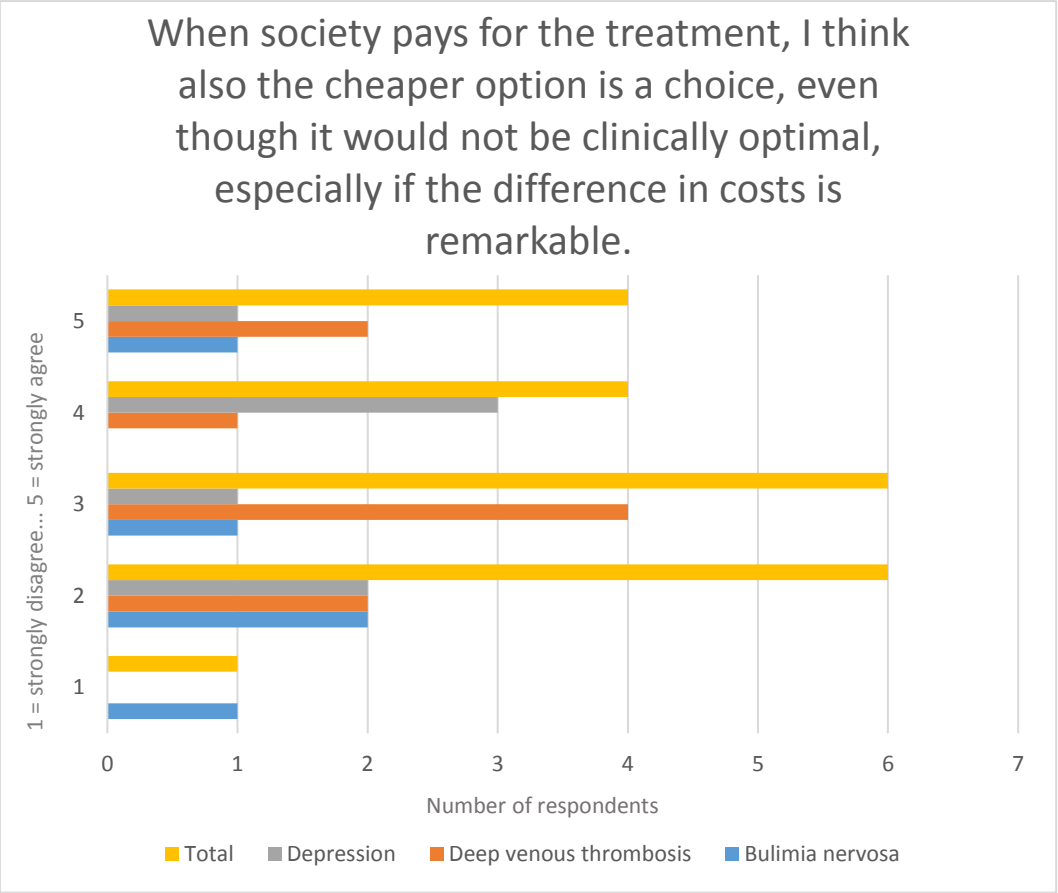
Three claims were particularly aimed at considering the role of the society as a paying party. These were presented to those respondents who answered 'yes' to the initial question on whether cost information affected the respondent's clinical decision-making. The first of these claims was: 'If treatments are clinically equal (benefits and harms) the cheapest option should be taken, especially if the society pays for the treatment.' Most respondents agreed with the claim, although now also number two from the five-step scale was used, indicating disagreement to some extent (Figure 9). In this claim the benefits and harms of treatment options were assumed equal, i.e. the claim was set to be neutral in health gain. However, I would not have been surprised even if all respondents had chosen '5' on the scale, to strongly agree with the claim, as in this way society's money could be saved. However, as the respondents used the spectrum from two to five, I assume colleagues also considered other factors than those given in the claim. These could involve factors such as differences in treatment protocols (invasive vs. non-invasive treatment, differences in dosage or delivery route of medication, frequency of laboratory visits), which might affect which treatments patients prefer. Due to these kinds of factors, some might be more compliant to treatment protocols that are not the cheapest choices.

Figure 9. Responses to claim: ‘If treatments are clinically equal (benefits and harms) the cheapest option should be taken, especially if society pays for the treatment.’



The next claim, and second in row addressing the society, was a continuation of the thought in the previous one: ‘When society pays the treatment, I think also the cheaper option is a choice, even though it would not be clinically optimal, especially if the difference in costs is remarkable.’. Here treatment options are no longer considered clinically equal. Room is given also for making the choice of a clinically suboptimal treatment, in case the cost difference would be substantial. Here I find it expected that the respondents used the whole range of answers (Figure 10), as the claim – more so than the previous one (Figure 9) – requires a decision that is also based on values: is it acceptable to trade health for money? If so, to which extent? These kinds of value-driven questions typically provoke various opinions.

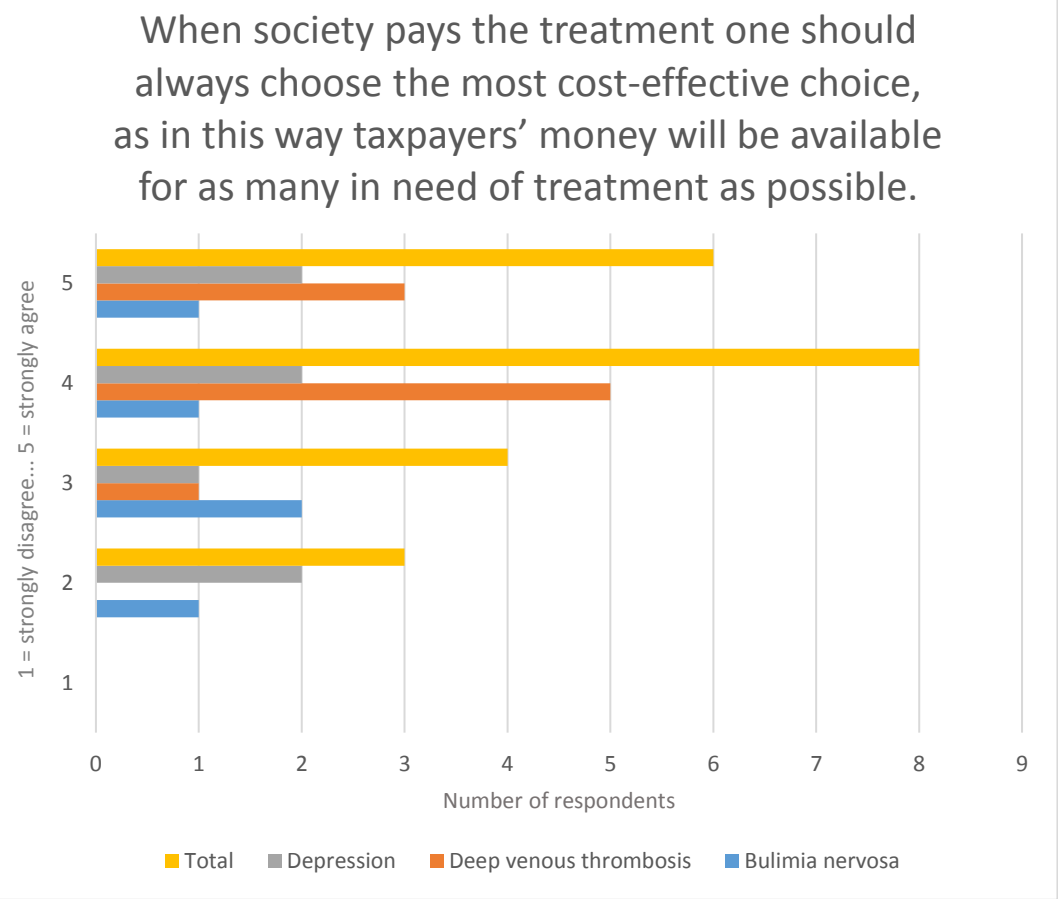
Figure 10. Responses to claim: ‘When society pays for the treatment, I think also the cheaper option is a choice, even though it would not be clinically optimal, especially if the difference in costs is remarkable.’



The third claim in this trio of society-directed claims takes the issue another step forward. Society as a paying party for treatments has already been recognized above in the claim assuming equal health gain but difference in costs (Figure 9), and in the claim assuming unequal health gain but remarkable difference in costs (Figure 10). The third claim said: ‘When society pays the treatment one should always choose the most cost-effective choice, as in this way taxpayers’ money will be available for as many in need of treatment as possible.’ Now, ‘social responsibility’ is emphasized by involving the idea of treatments being available for as many as possible, taken that resources are used

wisely by using the most cost-effective choice. Alike in the above claim assuming equal health gain (Figure 9), the spectrum of agreement spanned from slight disagreement to strong agreement, with the emphasis being on agreement (Figure 11). This is different from the span of responses to the claim assuming unequal health gain (Figure 10), where the distribution of responses spread more evenly between agreement and disagreement with the claim. These responses might reflect the general notion that for us doctors it is always easiest to choose, and we are typically more unanimous, if a treatment is clinically effective and health gain need not be compromised.

Figure 11. Responses to claim: 'When society pays the treatment one should always choose the most cost-effective choice, as in this way taxpayers' money will be available for as many in need of treatment as possible.'

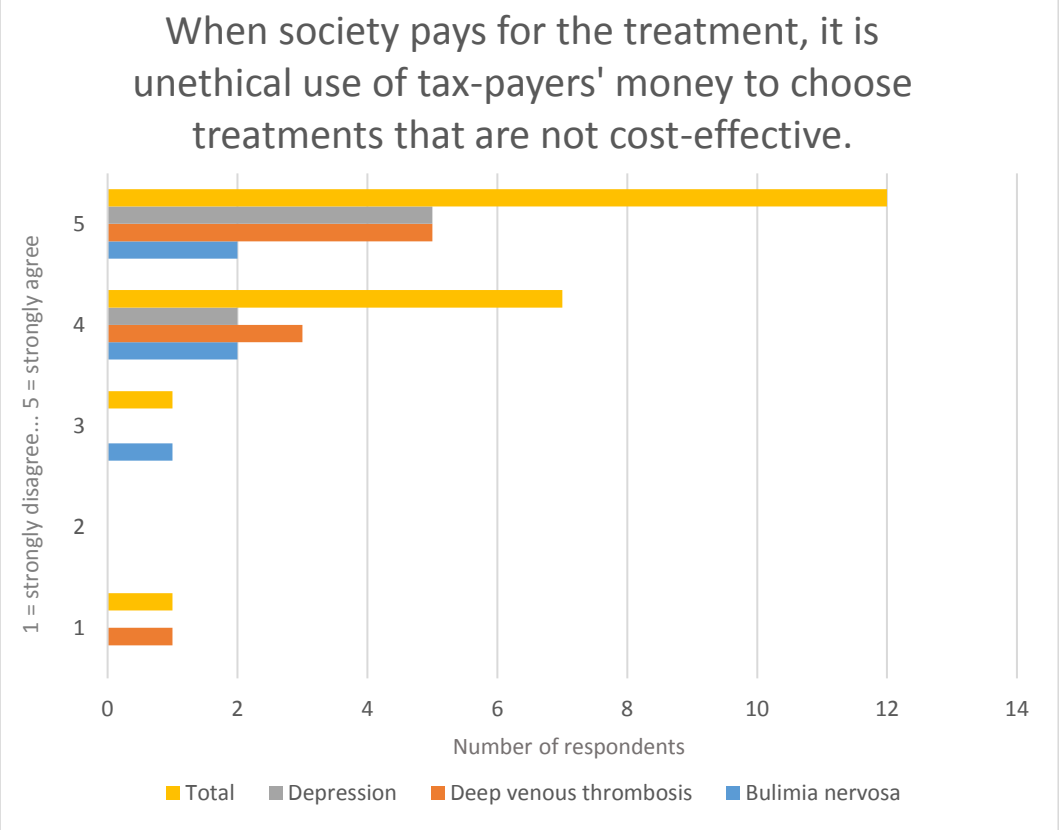


4.8. Ethicality

Ethicality is a theme that may not be left unnoticed when talking about healthcare. In one claim, ethicality was actively mentioned. It was presented to the group that answered 'yes' to the initial question on whether cost information affected their clinical decision-making: 'When society pays for the treatment, it is unethical use of tax-payers' money to choose treatments that are not cost-effective.' This claim was the first that showed a polarized distribution of responses, even though it was only one respondent who chose to strongly disagree with the claim. Almost all others agreed, as only one respondent chose option three in the middle (Figure 12). Thus, the responses were more unanimous than those for the earlier claim: 'When society pays the treatment one should always choose the most cost-effective choice, as in this way taxpayers' money will be available for as many in need of treatment as possible.' (Figure 11). This I find interesting as this earlier claim, also naming taxpayers as the paying party, already comes close to ethicality.

Cost-effectiveness is a concept familiar to medical doctors. In a way, it is a neutral term, as it only addresses the input of resources in relation to health out-put. Therefore, it does not as such contradict with ethical issues. Interestingly, the responses by medical doctors participating in this study were somewhat more heterogenous when asked about should the most cost-effective treatment choice always be taken when society pays for the treatment, for tax payers' money to be available for as many as possible. This theme might provoke a wider range of views, as it holds the idea of having to think of other persons' interests when treating one individual. Also, a treatment that is less cost-effective than another one may still be effective in clinical terms. As Saarni, in his doctoral thesis 'Effectiveness in Health Care Decision-making. An Ethical Analysis' (Saarni, 2010) points out, cutting out treatments that are even a little effective, would be regulating, whereas cutting out treatments that are not effective, would not. Decisions on regulating and prioritizing are usually perceived difficult due their ethical involvement, which is one reason why there tends to be various opinions.

Figure 12. Responses to claim: 'When society pays for the treatment, it is unethical use of tax-payers' money to choose treatments that are not cost-effective'

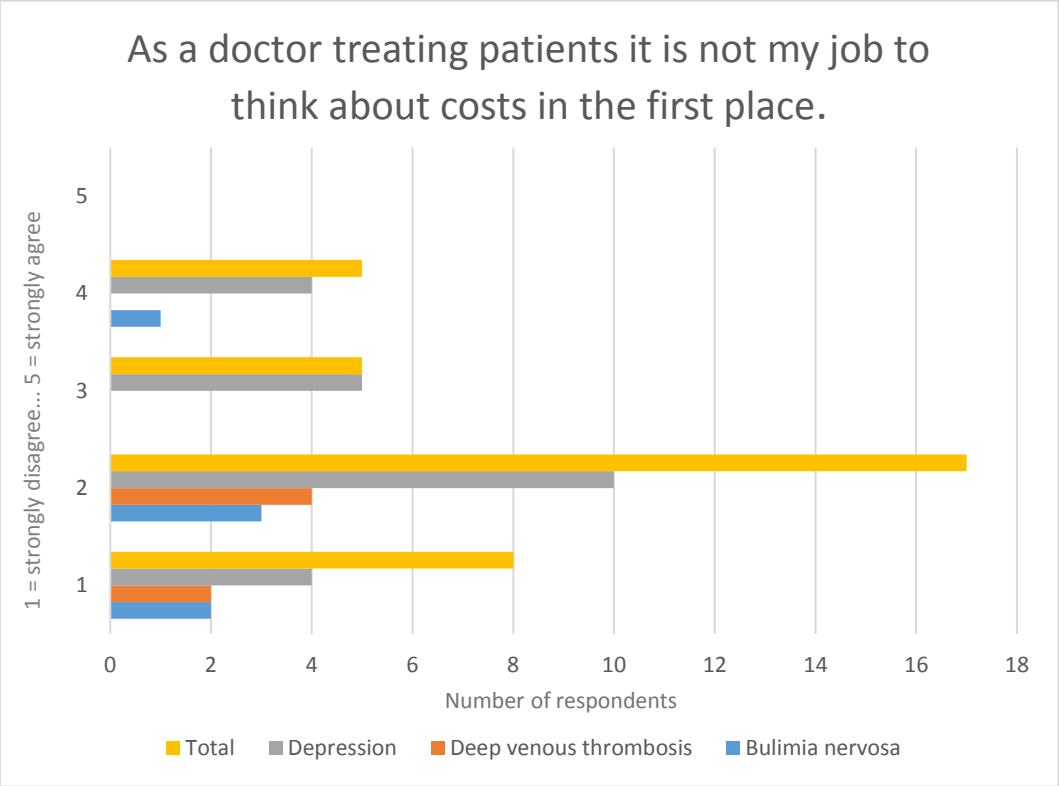


4.9. Stakeholders to evaluate how information on costs should affect clinical decision-making

The question of whom should evaluate the impact of costs on treatment decisions was evaluated in two study questions. First, in one of the claims in the second study question the role of the medical doctor him- or herself at the point of care was addressed, the claim being: 'As a doctor treating my patients it is not my job to think about costs in the first place.' None of the respondents strongly agreed with the claim (Figure 13). Most

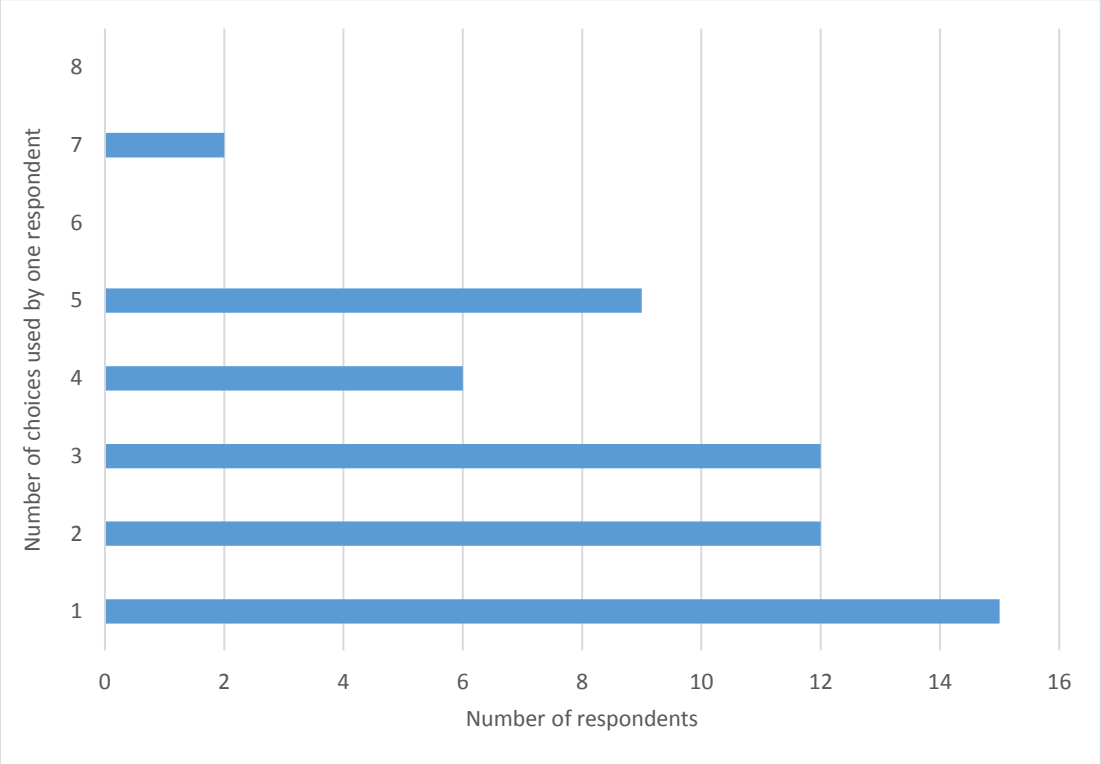
disagreed and, therefore, it can be concluded that they might see a medical doctor considering costs along with clinical aspects. To me this interpretation – naturally, interested in the topic as I am – sounds welcome. However, the results presented in Figure 13 should be analyzed keeping in mind that these respondents answered 'no' to the initial question on whether information on costs affected their clinical decision-making in the firsts place. At first thought, it might be seen contradictory to answer 'no' to the initial question and then not to agree with this claim. However, these two are not in contradiction with each other. Detaching information on costs from the point of making clinical treatment decisions does not exclude that practicing doctors could not, or would not think that they should, take part in considerations on costs. The implication that could be drawn here is that these considerations on costs should be done at a time other than that of the doctor-patient interaction.

Figure 13. Responses to claim: 'As a doctor treating patients it is not my job to think about costs in the first place.'



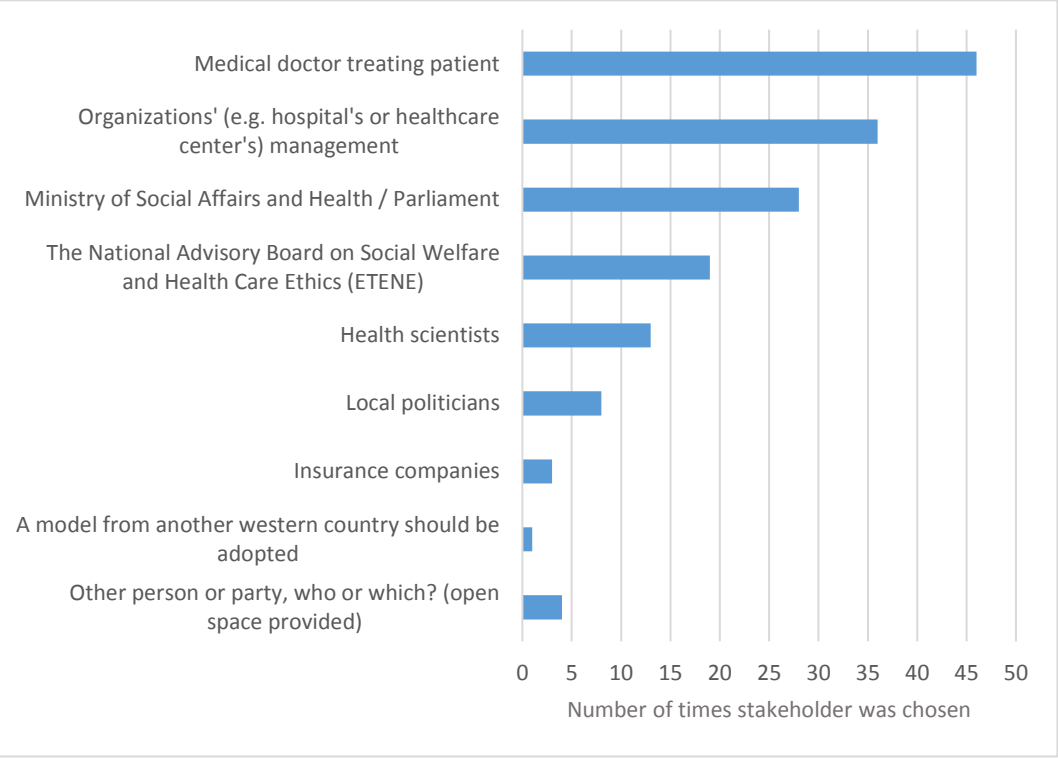
Proceeding now to the moment other than that of the patient interaction, let us consider the third and final question of this study. It addressed the topic of whose role it is to evaluate the impact of costs on treatment decisions. Respondents were given eight choices ready, and an open space was left for further suggestions. Respondents were free to choose as many options as they wanted. A total of 158 choices were made by the 56 respondents. Approximately half of the respondents, 27 out of 56 (48 %), chose only one or two options. The other half chose three options or more (Figure 14).

Figure 14. Information on how many options of different stakeholders were chosen by one respondent.



Most respondents, 46 out of 56 (82 %), saw that the medical doctor treating patients should be involved in evaluating how costs of treatments are to be evaluated in clinical decision-making (Figure 15). Of them, most (29 out 46) also chose the health care organization's management (Appendix 3). Organizational management was chosen 36 times in total (64 % of respondents). Of the minority of ten respondents who did not choose the medical doctor, seven chose the local organizational management and six chose the Ministry of Social Affairs and Health or the parliament as a stakeholder (Appendix 4).

Figure 15. Opinions on whom or which stakeholder should be involved in evaluating how costs are to be considered in clinical decision-making.



Considering the professional autonomy us doctors hold, I understand well that the majority saw that the medical doctor should be one evaluator here. This, together with the organizational management, would keep decision-making and evaluations on the role of

costs on the local level. Of interest is to note that at present, most managerial positions in public sector health care organizations are held by medical doctors. It would be interesting to see whether medical doctors would still value the local management as a stakeholder in case these positions would substantially fall outside the profession of medical doctors and other healthcare professionals to others, such as professionals in business administration and other economic sciences, or industrial engineering and management.

Political institutions and policy makers form one stakeholder. Half of the respondents chose the Ministry of Social Affairs and Health or the parliament as a stakeholder (Figure 15). Of these 28 respondents, most had also chosen the medical doctor (22 out of 28) and the local organizational management (21 out of 28; Appendix 3). Local politicians, however, were not often voted for. It might be, that the reason for these respondents choosing the Ministry as a stakeholder that should carry the responsibility of evaluating how costs are to affect availability of clinical treatments, lies in the Ministry being an organ with the possibility to implement social and health policy on all parties acting in health care.

The National Advisory Board on Social Welfare and Health Care Ethics (ETENE) was chosen by approximately a third of the respondents (19 out of 56). I would not have been surprised if ETENE would have been recognized even more often, as it is an established stakeholder in the Finnish health care field. Further, in case we would have to start choosing for example treatments that are not clinically superior but are cheaper, this surely holds numerous ethical considerations.

Players at the national level, like the Ministry and ETENE, have the possibility of implementing and guiding equal treatment choices for all citizens, irrespective of for example place of residence. This equality could be compromised if all health care produces could independently, at the local level, decide on treatments to be offered. This thought I base on the findings of Torkki (Torkki, 2012) who, in his doctoral thesis, showed that the productivity of different surgical units in Finland is not uniform, and not explainable by clinical features of patients or populations. Differences in processes offered as an explanatory factor. Therefore, I am not confident that in case all health care producers could locally decide on how costs of treatment were to affect treatment choices,

that this would result in an equal selection for all citizens. Equality, a generally accepted principle in our society, is also written down in how the Ministry of Social Affairs and Health defines its role and, also, how the national Current Care Guidelines for clinical practice see their role. These are, respectively, "to ensure that everyone has an equal opportunity to lead a healthy and socially secure life" (The Ministry of Social affairs and Health, 2017) and "to improve the quality of care and decrease inconsistencies between treatment practices" (Current Care Guidelines, 2015). Having now touched the topic of equality I find it both proper and necessary, for the sake of clarity, to point out that in the present study the respondents were offered, in their fictitious patient cases, only such treatment options that were derived from the national evidence-based Current Care guidelines. Therefore, the respondents answered the study in this context and no other. It follows, that even if the respondents mostly chose the local level, medical doctor and organizational management, as the parties relevant for deciding on how costs are to be accounted for in clinical decision-making, a conclusion may not be drawn that these respondents would be promoting either nationally unequal practices or inequality between citizens. Such a conclusion would neither be righteous towards the respondents nor based on the findings of this study. Rather, my discussion above is an extension of thought arising from the topic of this study.

Another result I find interesting was that health scientists were recognized only by approximately a fifth of respondents (13 out of 56), as health science provides means of evaluating and comparing clinically meaningful interventions against costs. However, I do understand that showing cost-effectiveness or cost-utilities of comparable treatment choices does not yet include all the values and preferences a society might have for these treatments.

Only few respondents chose insurance companies or a model from another western country to be applied. This could be seen as wanting to detach the financial interests insurance companies have, and also recognizing that these issues need to be handled domestically, in the Finnish socio-cultural environment.

The opportunity to use the open space was used only three times. These suggestions included the following parties:

- the patient
- National Current Care guideline office
- The Finnish Medical Society Duodecim and its Current Care guideline office, working together with pharmacists

About political parties it was said that:

- political decision-making should be clearly separate,
- political instances might make alignments, but should not set restrictions.

Concerning the small number of free responses, I would assume it is easier to choose from options that are set ready, and free writing may be experienced too time consuming. Therefore, I would be hesitant to draw a conclusion that all other 53 respondents would not come to think of additional parties, were they provided more time or were they involved in discussion on the topic. It might also be that if one the options mentioned in the free space, for example the national Current Care guideline office, would have been given as a ready-set option, it might have been chosen by the respondents. However, as this now remains a speculation, let me comment on the suggestions given. The national Current Care guideline office has, indeed, occasionally been approached with suggestions that it should evaluate the costs of treatments as it produces clinical practice guidelines (Komulainen, 2017). Concerning the opinion that political decision-making should be clearly separate, I believe there would be others thinking alike in the medical profession. What comes to involving patients as stakeholders, I assume the involvement would depend on whether the decision-making concerns situations as described in study question number two – patient deciding on his or her individual treatments (Figure 7, Figure 8) – or whether we think of a general discussion. In the latter case, patient organizations, presenting a broader voice, offer as one stakeholder.

4.10. Medical doctors and costing systems: a possibility

In addition to national level reimbursements for medicine expenses discussed earlier (Chapter 4.6.), there are also other ways to achieve cost reductions in a manner that does not involve the practicing medical doctors' clinical decision-making. Let me consider these next, while remembering that it is not, by any means, my intention to lead the reader into thinking that the role of the practicing medical doctor as a party affecting healthcare costs could be nullified. Moving from the national level to the organizational level, cost reductions may be achieved by improving organizational efficiency. This would include identifying waste within the organization's own work practices, and knowing what the economic impact of each activity is. Costing methods, introduced in the literature review of this thesis, offer tools to manage these. Using them successfully within healthcare organizations requires knowledge of the branch and understanding the relationships of different activities and professional groups within healthcare organizations. Applying these costing methods within healthcare is still relatively new, but a strong need might arise once the health, social services and regional government reform planned in Finland takes place (Ministry of Finance and Ministry of Social Affairs and Health, 2017). According to the plans, public sector health care producers should undergo incorporation in the hope of more cost-effective practices. This offers the medical doctors in managerial positions a possibility to learn contemporary ways of assessing costs. Then, if financial measures would have s stronger foothold in evaluating organizational efficiency, cost information might naturally become a means of leading doctors in their practice.

4.11. Summary of findings

For the possibility of seeing the key findings of this study at a glance, these are summarized in Table 6. The summary is given according to the themes above. As a summary like this is always a simplification of the findings, analysis and discussion, the reader is referred to the above chapters for further insight.

Table 6. Summary of key findings.

Theme	Key finding, analysis and discussion
1. Response rates	Response rates to the study were between 13 and 47 % in the three organizations. Medical doctors are not keen on answering questionnaires amidst their clinical work.
2. Effect on cost information on clinical decision-making	For two out of three, the information did not affect clinical decision-making.
3. Attitudes towards bringing information on costs visible at the point of care	Almost all agreed that this information was welcome. This shows the present study was of a current topic.
4. Time	Medical doctors do not see that time would be a limiting or determining factor in whether they take costs into account in clinical decision-making.
5. Clinical aspects	Medical doctors emphasize clinical aspects, even if they would consider costs.
6. The patient as a paying party	Medical doctors would discuss with their patients such costs that fall on the patient to carry.
7. The society as a paying party	Medical doctors would choose the cheapest treatment in case the options would be clinically equal. In cases of remarkable difference in costs, many could choose a clinically inferior treatment. In terms of cost-effectiveness, the most cost-effective treatment might usually, but not always, be chosen.
8. Ethicality	Medical doctors were relatively unanimous on choosing the most cost-effective treatment when considering that tax-payers' money should be made available for as many as possible.
9. Stakeholders evaluating how information on costs should be taken into account in clinical decision-making	Most named the medical doctor and local management. A half named the Ministry of Social Affairs and Health or the parliament. The National Advisory Board on Social Welfare and Health Care Ethics (ETENE) was chosen by approximately a third.
10. Costing systems	Several costing methods offer medical doctors the possibility of learning contemporary costing assessment. This might come in need once the big health, social services and regional government reform takes place.

5. Conclusion

5.1. Research summary

This thesis was carried out in our times of rising health care expenditure. In Finland in 2014, health care costs formed 9,5 % of the gross national product, being 19,5 billion in euros, and making 3 576 euros per capita (Matveinen and Knape, 2016). Medical doctors, as the ones deciding on treatments, hold a key position in defining healthcare expenses. With a big health, social services and regional government reform just about to be performed in Finland (Ministry of Finance and Ministry of Social Affairs and Health, 2017), the issue of costs is highly current to medical doctors.

The point where all medical doctors come across costs of treatment is the everyday point of making clinical treatment decisions. In this way, in their patient interaction all practicing medical doctors have an impact on healthcare expenditure, whether they actively acknowledge it, or want to think about it that way or not. A leadership question is whether doctors could be led by information, namely by information on costs. For this purpose, the first step necessary was to find out whether medical doctors see information on costs to affect their clinical decision-making in the first place, and why so. This study was undertaken to take this first step as, to my knowledge, no such study among Finnish medical doctors has been performed before.

The specific research questions were as follows.

- Does information on the costs of treatment affect clinical decision-making of Finnish medical doctors, as evaluated by themselves?
- What are the reasons that the information on costs does or does not affect clinical decision-making?
- Whom should it be, as evaluated by the doctors, to make decisions on how costs of treatment should affect treatment choices?

A study was designed with a questionnaire-link sent by email to Finnish medical doctors in three different organizations in different geographical locations. After anonymous handling of data, it was seen that Finnish medical doctors welcome the information on treatment costs alongside clinical information, i.e. the benefits and harms (effects and side-effects) of treatment. However, more than half said this information did not affect their clinical decision-making. Thus, this information per se does not yet provide a means for management in leading medical doctors towards cost reductions. However, doctors did take notion of costs falling on the patients. Therefore, medical doctors seem to consider treatment options from the patient's view in a holistic manner: clinical effects, costs, and – most likely also, although not asked for in this study – other effort the treatment would cause the patient. This is in line with the mentality of the medical profession, which derives from the Hippocratic Oath: Primium est non nocere (*latin*). That is, do not harm your patient. We doctors have often taken this to the measures of doing everything possible, even though the gain in health and quality of life with maximal extra interventions might be marginal. In a scenario where all doctors would continue in this manner along with the ever-developing possibilities of diagnostic and treatment options, healthcare expenditure would nothing but keep on increasing.

The respondents were asked about whom or which stakeholder should be involved in evaluating how costs are taken into account in clinical decision-making. Most doctors thought these evaluations should be kept within the medical profession and at the local level. The medical doctor him- or herself was the person or stakeholder most often chosen. Also, the healthcare organization's management was a popular choice. Of other stakeholders, the Ministry of Social Affairs and Health gained some support, as did the National Advisory Board on Social Welfare and Health Care (ETENE). The stakeholders least often chosen were local politicians, insurance companies, or a model from another western country. Also, an active suggestion was to involve costs in Finnish national clinical guidelines, the Current Care guidelines (2015). These are independent, evidence-based guidelines that have their own, established status as an information source among Finnish healthcare professionals. As a conclusion from these responses, I see them in line with the professional autonomy of medical doctors, who are used to drawing their own conclusions from information provided. This line of thought would offer leading by

information as a means for managing doctors. However, as this study showed, information on costs of parallel treatment options is not an efficient way. An opportunity might rise in organizational costs, for which costing systems applicable to healthcare were reviewed in this thesis. These should be of interest to the profession of medical doctors who, in my opinion, should stay in decisive roles once new corporations are formed and their cost structures defined in the becoming healthcare reform (Ministry of Finance and Ministry of Social Affairs and Health, 2017).

5.2. Practical implications

This study has the following practical implications. Firstly, I hope it will serve as a source and stimulator of ideas for managers when considering how medical doctors, as a personnel resource, may be led towards cost reducing practices. These ideas might rise from not only the direct results obtained in this study but also from the literature review and ideas brought up in the discussion. These include:

a. The point of clinical decision-making might offer limited possibilities for cost reductions, as factors other than costs affect the choice of treatment more than costs do.
b. Medical doctors in the public sector, even in managerial positions, might not all be fully aware of different costing systems developed and useful also in the healthcare industry. A need for this awareness increases along with the planned incorporation of public sector health care providers, as the health, social services and regional government reform in Finland soon takes place (Ministry of Finance and Ministry of Social Affairs and Health, 2017).
c. Medical doctors should be actively involved in these future changes, as they have profound knowledge of the branch and are central players in delivering health care.

Secondly, I hope this study will serve as one stimulator to the general discussion on costs in healthcare. In this, I see at least the following two entities:

a. When choices on possible trade-offs between health gain and costs have to be made, a broad discussion is needed in the Finnish society. No one profession should make such decisions, as the viewpoints are more numerous than any one profession holds. Further, no one profession should be left with the burden of – or be allowed to – making decisions that would practically be choices on prioritizing and regulating patient care.
b. Not all questions of cost reduction and effective practices in health care are matters of prioritizing or regulating patient care. In the Finnish public-sector healthcare there most likely is slack that may be gotten rid of with better cost awareness and knowledge of cost-reducing tools. Therefore, general discussion on the topic hopefully raises interest and inspires a learning spark for cost issues among my colleagues in the medical profession.

5.3. Limitations of the study

This study has the following limitations. Firstly, as this study was an initial one among Finnish medical doctors' attitudes towards information on costs of treatment, it does not show any evidence of using this information in managing doctors as a personnel resource. While it does give ideas for this, conclusions made would remain a speculation.

As what comes to the conclusions that may be directly drawn, i.e. the direct results of the medical doctors' opinions, it should be kept in mind that this study only reached a small part of Finnish doctors. Therefore, the results may not be extrapolated to all Finnish doctors even though, intuitively, I would assume many results – like a doctor acting with emphasis on clinical issues and not costs – would apply.

5.4. Suggestions for further research

The present study was a relatively small one on a highly current topic: Finnish medical doctors' attitudes and opinions on costs of medical treatment options. For further research, I would like to make the following suggestions:

a. The same topic as studied now could be taken wider. A larger study among all Finnish colleagues would offer us wider grounds for making conclusions alike the ones in this study, as well as for producing information that management could better lean on. As a party for performing such profession-wide studies I see the Finnish Medical Association most suitable.
b. Further research could go beyond the theme of the present study, which was costs of individual treatments. For example, medical doctor's knowledge of costing systems within healthcare could be studied. Alike in the present study, this could be accompanied with finding out about doctors' views on whose job it is to handle costing issues. This would make a further step on the way of implementing cost-knowledge and cost-reducing thinking among medical doctors. Also, it would offer insight on how, or by which profession, these issues should be managed.
c. Once the planned health, social services and regional government reform in Finland takes place (Ministry of Finance and Ministry of Social Affairs and Health, 2017), a huge arena for organizational research opens. This reform will be of huge magnitude within the healthcare sector. It will not only affect one profession and one topic – medical doctors and costs, like in this study – but will affect all professionals in the field and will cover changes in work practices, human relations and organizational processes, to mention a few.

6. Literature

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Appendices

Appendix 1. Hippocratic Oath: Classical Version

I swear by Apollo Physician and Asclepius and Hygieia and Panaceia and all the gods and goddesses, making them my witnesses, that I will fulfill according to my ability and judgment this oath and this covenant:

To hold him who has taught me this art as equal to my parents and to live my life in partnership with him, and if he is in need of money to give him a share of mine, and to regard his offspring as equal to my brothers in male lineage and to teach them this art—if they desire to learn it—without fee and covenant; to give a share of precepts and oral instruction and all the other learning to my sons and to the sons of him who has instructed me and to pupils who have signed the covenant and have taken an oath according to the medical law, but no one else.

I will apply dietetic measures for the benefit of the sick according to my ability and judgment; I will keep them from harm and injustice.

I will neither give a deadly drug to anybody who asked for it, nor will I make a suggestion to this effect. Similarly I will not give to a woman an abortive remedy. In purity and holiness I will guard my life and my art.

I will not use the knife, not even on sufferers from stone, but will withdraw in favor of such men as are engaged in this work.

Whatever houses I may visit, I will come for the benefit of the sick, remaining free of all intentional injustice, of all mischief and in particular of sexual relations with both female and male persons, be they free or slaves.

What I may see or hear in the course of the treatment or even outside of the treatment in regard to the life of men, which on no account one must spread abroad, I will keep to myself, holding such things shameful to be spoken about.

If I fulfill this oath and do not violate it, may it be granted to me to enjoy life and art, being honored with fame among all men for all time to come; if I transgress it and swear falsely, may the opposite of all this be my lot.

—Translation from the Greek by Ludwig Edelstein. From *The Hippocratic Oath: Text, Translation, and Interpretation*, by Ludwig Edelstein. Baltimore: Johns Hopkins Press, 1943.

http://www.pbs.org/wgbh/nova/body/hippocratic-oath-today.html (cited on March 9, 2017)

Appendix 2. Lääkärinvala (in Finnish)

Lääkärinvalassa lääkäri sitoutuu noudattamaan lääkärin eettisiä sääntöjä. Vala pohjautuu Hippokrateen valaan sekä Maailman lääkäriliiton vuonna 1949 hyväksyttyyn Geneven julistukseen. Lääketieteen lisensiaatit vannovat valan valmistumistilaisuudessa.

https://www.laakariliitto.fi/liitto/etiikka/laakarinvala/

Vakuutan kunniani ja omantuntoni kautta pyrkiväni lääkärintoimessani palvelemaan lähimmäisiäni ihmisyyttä ja elämää kunnioittaen. Päämääränäni on terveyden ylläpitäminen ja edistäminen, sairauksien ehkäiseminen sekä sairaiden parantaminen ja heidän kärsimystensä lievittäminen.

Työssäni noudatan lääkärin etiikkaa ja käytän vain lääketieteellisen tutkimustiedon tai kokemuksen hyödyllisiksi osoittamia menetelmiä. Tutkimuksia ja hoitoja suositellessani otan tasapuolisesti huomioon niistä potilaalle koituvan hyödyn ja mahdolliset haitat.

Pidän jatkuvasti yllä korkeaa ammattitaitoani ja arvioin työni laatua.

Suhtaudun kollegoihini kunnioittavasti ja annan heille apuani, kun he potilaita hoitaessaan sitä pyytävät. Rohkaisen potilaitani kysymään tarvittaessa myös toisen lääkärin mielipidettä.

Kunnioitan potilaani tahtoa. Pidän salassa luottamukselliset tiedot, jotka minulle on potilaita hoitaessani uskottu. Täytän lääkärin velvollisuuteni jokaista kohtaan ketään syrjimättä enkä uhkauksestakaan käytä lääkärintaitoani ammattietiikkani vastaisesti.

Accessed March 12, 2017

Appendix 3. Results on study question 3 "Whom or which stakeholder should be involved in evaluating how costs are taken into account in clinical decision-making". Options chosen simultaneously.

The table shows which options were chosen simultaneously by the respondents. For example, of those 46 choosing 'Medical doctor treating patient', 29 chose 'Organizations' (e.g. hospital's or healthcare center's) management' and 16 chose 'The National Advisory Board on Social Welfare and Health Care Ethics (ETENE)'.

	Medical doctor treating patient	Organizations' (e.g. hospital's or healthcare center's) management	Health scientists	Local politicians	Ministry of Social Affairs and Health / Parliament	Insurance companies	The National Advisory Board on Social Welfare and Health Care Ethics (ETENE)	A model from another western country should be adopt	Other person or party, who or which? (open space provided)
Medical doctor treating patient	**46**	29	11	7	22	3	16	1	3
Organizations' (e.g. hospital's or healthcare center's) management	29	**36**	11	8	21	3	17	0	4
Health scientists	11	11	**13**	3	9	3	7	0	0
Local politicians	7	8	3	**8**	7	2	6	0	0
Ministry of Social Affairs and Health / Parliament	22	21	9	7	**28**	3	16	0	1
Insurance companies	3	3	3	2	3	**3**	2	0	0
The National Advisory Board on Social Welfare and Health Care Ethics (ETENE)	16	17	7	6	16	2	**19**	0	1
A model from another western country should be adopted	1	0	0	0	0	0	0	**1**	0
Other person or party, who or which? (open space provided)	3	4	0	0	1	0	1	0	**4**

Appendix 4. Appendix 3. Results on study question 3 "Whom or which stakeholder should be involved in evaluating how costs are taken into account in clinical decision-making". Options not chosen simultaneously.

The table shows which options were not chosen simultaneously by the respondents. For example, of those ten respondents who did not choose 'Medical doctor treating patient', 7 chose 'Organizations' (e.g. hospital's or healthcare center's) management' and 6 chose 'Ministry of Social Affairs and Health / Parliament'.

	Medical doctor treating patient	Organizations' (e.g. hospital's or healthcare center's) management	Health scientists	Local politicians	Ministry of Social Affairs and Health / Parliament	Insurance companies	The National Advisory Board on Social Welfare and Health Care Ethics (ETENE)	A model from another western country should be adopt	Other person or party, who or which? (open space provided)
Medical doctor treating patient	**0**	7	2	1	6	0	3	0	1
Organizations' (e.g. hospital's or healthcare center's) management	17	**0**	2	0	7	0	2	1	0
Health scientists	35	25	**0**	5	19	0	12	1	4
Local politicians	39	28	10	**0**	21	1	13	1	4
Ministry of Social Affairs and Health / Parliament	24	15	4	1	**0**	0	3	1	3
Insurance companies	43	33	10	6	25	**0**	17	1	4
The National Advisory Board on Social Welfare and Health Care Ethics (ETENE)	30	19	6	2	12	1	**0**	1	3
A model from another western country should be adopted	45	36	13	8	28	3	19	**0**	4
Other person or party, who or which? (open space provided)	43	32	13	8	27	3	18	1	**0**